



GRADE

1

Teacher's Resource Guide

**An Introduction to Plants,
Animals and Healthy Habitats**



O`AHU



Teacher's Resource Guide

AN INTRODUCTION TO PLANTS AND ANIMALS

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Hawai'i Nature Center

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Table of Contents

FOREWORD	V
PROGRAM LESSONS & ACTIVITIES	1
Program Overview	1
Program Schedule	1
Introduction	2
Morning Activities	2
Stream Safari	2
Habitat Hunt	3
Food Chain Challenge	3
After Lunch Activities	4
Composting	4
Recycling	4
Summary	4
FIELD TRIP PREPARATION, REMINDERS & POST VISIT ACTIVITIES	5
In-class Preparation	5
Before Your Visit	5
On the Day of the Field Trip	5
Extended Activities	6
After Your Visit	6
BACKGROUND INFORMATION FOR TEACHERS	7
Habitat	7
The Food Chain	8
Plants & Animals in the Stream Ecosystem	9
Safety Concerns	9
SAMPLE LETTER TO PARENTS	11
FIELD TRIP SONG	12
MAP TO FIELD SITE	13
RECOMMENDED REFERENCES	14
APPENDICES	19

AN INTRODUCTION TO PLANTS AND ANIMALS



Foreword

This Resource Guide is provided to assist classroom teachers planning to bring their students to the Hawai'i Nature Center's Grade 1 Program, *An Introduction to Plants and Animals and Healthy Habitats*. It includes an outline of the program's key concepts, goals and objectives, and brief descriptions of the various activities in which students may participate. There are also suggestions for pre-visit preparation and post-visit follow up, scientific background, an annotated reference list, and a sample letter to send home to parents.

Leading early childhood specialists underscore the value of direct experiences for children. Moreover, many noted scientists attest that their commitment to the environment can be traced back to time spent with mud puddles and insects, and the guidance of an interested adult. We believe that a Hawai'i Nature Center field trip is far more than just child's play, and may be the start of a lifelong connection between students and the natural world.

We are delighted that you have elected to bring your students to visit us, and look forward to a wonderful day in the great, green out-of-doors.

AN INTRODUCTION TO PLANTS AND ANIMALS



Program Lessons & Activities

Hawai'i Nature Center
Environmental Education Field Program



PROGRAM OVERVIEW

Key Concepts:

There are many different types of plants and animals in nature. Plants and animals are important to people. All plants and animals, including humans, need a healthy habitat. Everyone can help care for plants and animals and the island home we share. By recycling and composting we can help keep our habitat healthy.

Goals:

1. To foster an awareness and appreciation of nature, with an emphasis on food chains and habitats.
2. To expose students to the plants and animals found in lowland Hawaiian forest and stream environments.
3. To promote enthusiasm for taking action in helping to keep our island habitat clean.

Objectives:

1. Students will be able to describe the essential elements of a healthy habitat and demonstrate a simple food chain.
2. Students will be able to express why nature is important to them and why we need to help keep our habitat clean.
3. With the appreciation, knowledge, and awareness of nature gained from HNC's hands-on outdoor activities, students will have the motivation and skills needed to take action and start a recycling project at school.



PROGRAM SCHEDULE

9:00-9:30	Introduction to Plants and Animals, bathroom break
9:30-10:05	Field Activities: 1st rotation
10:05-10:40	Field Activities: 2nd rotation
10:40-11:15	Field Activities: 3rd rotation
11:15-11:45	Lunch (includes wash-up and clean-up)
11:45-12:05	After Lunch Activity: 1st rotation
12:05-12:25	After Lunch Activity: 2nd rotation
12:30-12:45	Summary, clean up, return to school

AN INTRODUCTION TO PLANTS AND ANIMALS



AN INTRODUCTION TO PLANTS AND ANIMALS

**INTRODUCTION**

Key Concepts: All plants and animals need a habitat. A habitat includes food, water, shelter and space.

Objective: Students will be able to define a habitat, and match plants and animals to their appropriate habitat.

<Benchmark SC1.3.1: Cycles of Matter and Energy>

<Benchmark SC 1.4.1: Classifications>

<Benchmark SC 1.5.2: Unity and Diversity>

Activity: Using animal and plant props and photos of different habitats of Makiki Valley, Nature Center staff lead students through an introduction to the habitats of plants and animals. Our presentation is designed to stimulate children's enthusiasm for exploring living things, and prepare them for an adventure-filled morning in the great outdoors.

**MORNING ACTIVITIES****Stream Safari**

Key Concepts: Both living and nonliving things are part of the stream habitat. Only certain types of plants and animals can live in freshwater environments.

Objectives: Students will be able to identify several different plants and animals that live in and around the stream, and describe ways they can help care for the stream environment.

<Benchmark SC 1.1.1: Scientific Inquiry>

<Benchmark SC 1.2.2: Unifying Concepts and Themes>

<Benchmark SC 1.3.1: Cycles of Matter and Energy>

<Benchmark SC 1.5.1: Heredity>

<Benchmark SC 1.5.2: Unity and Diversity>

Activity: Students will gather at the edge of Makiki Stream to explore and discover plants and animals living there. After reviewing the components of a stream habitat with help from colorful props, they'll be challenged to work in small groups to create a miniature stream in a bin!

Habitat Hunt

Key Concepts: All living things have basic survival requirements. Plants and animals, including humans, can find what they need to survive within their habitat. Habitats are everywhere and we can all help keep habitats healthy.

Objectives: Students will be able to identify components of a habitat, and describe the habitats of several different types of plants and animals, including humans. Students will describe ways that we can help keep the forest habitat clean (i.e., don't litter, reduce, reuse, recycle).

<Benchmark SS 1.8.1: Limited Resources and Choices>

<Benchmark SC 1.3.1: Cycles of Matter and Energy>

<Benchmark SC 1.4.1: Classifications>

<Benchmark SC 1.5.1: Heredity>

<Benchmark SC 1.5.2: Unity and Diversity>

Activity: In a cozy clearing on a mountain path, we'll review the habitat needs of people and other living things. From there, we'll set out on a hike along the side of the mountain in search of wild plant and animal habitats. Along the way, we'll be sure to pick up any human-made litter and talk about why it does not belong in nature. HNC staff will explain the difference between natural, organic items that decompose versus human-made trash that does not.

Food Chain Challenge

Key Concepts: All living things ultimately depend upon the sun for their food supply. Plants make their food from the sun. Animals depend on plants or animals for their food (energy).

Objectives: Students will be able to describe a simple food chain, and explain the role of the sun.

<Benchmark SC 1.1.1: Scientific Inquiry>

<Benchmark SC 1.2.2.: Unifying Concepts and Themes>

<Benchmark SC 1.3.1: Cycles of Matter and Energy>

<Benchmark SC 1.4.1: Classifications>

<Benchmark SC 1.5.1: Heredity>

<Benchmark SC 1.5.1: Unity and Diversity>

Activity: Students will role play a food chain in nature, then create a food chain of their own in a Hawai'i Nature Center bug box.



AN INTRODUCTION TO PLANTS AND ANIMALS

**AFTER LUNCH ACTIVITIES****“HOW CAN WE HELP TAKE CARE OF NATURE?”****Rotation 1 - Composting**

Key Concepts: Instead of taking up more space in the landfill, students will learn how vegetarian food scraps and other organic matter can be recycled back into the earth. Composting is easy to do and lots of fun!

Objective: Students and teachers will learn the “compost recipe” and be able to create their own compost pile at school.

Activity: Students will add their lunch leftovers to the Center’s compost pile. They will also add decomposing plant materials to the pile, help aerate the compost, and dig through the pile to discover the little compost critters that help to recycle nutrients.

Rotation 2 - Recycling

Key Concepts: Where does our rubbish go? Using the student’s lunch materials as examples, HNC staff will explain where most of our trash ends up: the landfill. Much of human-made trash can be recycled. Everyone can help take care of our island habitat by reducing, reusing, and recycling!

Objectives: Students will be able to identify which part of their lunches can be recycled. Students and teachers will learn how easy it is to set up their own recycling bins at school. Students will also be able to give examples of things that can be reused and reduced.

Activity: Students will sort through their own lunch containers and figure out which items can be recycled. They will crush their aluminum cans and plastic bottles and add them to our recycle bins (or their own bins). HNC staff will assist the class in starting their own recycling project.

**SUMMARY**

Key Concepts: Plant and animal habitats are found all over our playgrounds and neighborhoods. There are many different things First Graders can do to take care of plants and animals and their homes (our home!).

Objectives: Students will be able to explain why we should reduce, reuse, and recycle. They will understand where our trash goes and be able to explain what they can do to lessen the amount that goes into our landfills.

Activity: Gathered together at the end of a fun-filled day exploring nature, students and teachers will work with HNC staff in planning their own recycling project for their classroom or school campus (ilele, composting and/or recycling).

Field Trip Preparation, Reminders & Post-Visit Activities

Hawai'i Nature Center
Environmental Education Field Program

Grade

1



IN-CLASS PREPARATION

Before Your Visit

The following activities may help your class prepare for their visit to the Hawai'i Nature Center:

- Discuss the concept of a food chain. Build a paper chain food chain based on a school lunch! Use pictures or empty packages to illustrate the various components of the day's meal.
- Review the concept of a habitat. Try the *'Ōhi'a Project* activity *A Happy Place to Live*, (enclosed) or *A Fish in a Tree*.
- Become familiar with the plants and animals of your school yard. Do a nature treasure hunt (looking for feathers, seeds, flowers, etc.) or try *Schoolyard Search*, enclosed.
- Review the differences between living and nonliving things.
- Introduce students to some of the stream organisms they may see on their visit, including fish, prawns, snails, and algae. You may wish to use the illustrations in this packet.



ON THE DAY OF THE FIELD TRIP

Important reminders for the day:

- Divide students into three equal size groups of 20 students or less (unless your group is small).
- Bring one adult for every 10 students.
- EVERYONE, including teachers and parents, need name tags.
- Mosquito repellent - please do not apply to face or hands (long sleeved shirts and long pants are the best protection)
- Have students wear old clothes and sneakers, and bring rain gear with a hat or hood.
- Bring large garbage bags to take lunch litter back to school.

AN INTRODUCTION TO PLANTS AND ANIMALS



AN INTRODUCTION TO PLANTS AND ANIMALS



EXTENDED ACTIVITIES

After Your Visit

Before the excitement cools, try some of these activities to reinforce the material presented:

- Have students draw posters of the stream environment. Provide a list of plants and animals to be placed in the appropriate habitat, or duplicate the illustrations provided, and have students paste them into place. (Note: Organisms are drawn to various scales.)
- Initiate a habitat hunt of the nooks and crannies in your classroom.
- Build a freshwater aquarium for your classroom (see directions reproduced from the *Hawaii Nature Study Program*). Alternatively, build a classroom terrarium or ant farm.
- Discover just how important pesky gnats and flies are in the food chain! Adopt a spider web near your classroom, and monitor the number of insects needed to keep the spider fed.
- Place a white sheet beneath a bush and shake! Have students search for the animals that fall out. Where do they get their food and water? What is their shelter? How much space do they need? What might eat them? Repeat elsewhere in a schoolyard habitat hunt!
- Remind students that we all must be stewards of nature. Try *M is for Mālama*, enclosed.
- Add hand motions to the song presented during the day (lyrics enclosed) to reinforce concepts.
- Have students choose one part of nature, from a tree to a rock to a gecko, and do one nice thing for their special nature friend every week.



Background Information for Teachers

Hawai'i Nature Center
Environmental Education Field Program

Grade

1



HABITAT

A habitat is simply the place where a plant or animal lives. An amoeba's habitat might be one square millimeter at the bottom of a puddle, while an insect might need the whole puddle, or a frog's habitat might engulf several puddles. Young children may better understand the concept of habitat if it is initially used interchangeably with neighborhood. By discussing the things we need in our neighborhood, children can help to define their own habitat requirements. While there is an infinite variety of habitats, most include 4 common elements: food, water, shelter, and space.

Food requirements will be discussed in greater depth in the Food Chain section to follow. Water requirements vary greatly between and among different organisms. In general, plants require much more water for their mass than animals do; plants use water only once, taking it in through their roots and releasing it during photosynthesis, while water is able to circulate through animals many times before being released as perspiration or waste.

All living things need some sort of shelter, or physical support. Birds build nests, fish live in water, spiders spin webs, and so forth. While people will suffer if overexposed to sun, rain, and wind, many plants and animals need these conditions to survive.

Space is a requirement that is not always easy to define. Scientists define a "critical habitat" as the minimum habitat boundaries a particular organism needs to survive. In general, small organisms that can feed off a variety of easily obtained substances (such as the amoeba above) have small space requirements. Larger animals, or those that need to travel great distances to obtain sufficient food, have larger space requirements. Plants also demand a certain amount of space to grow, flower, and reproduce. In our experience, children tend to underestimate space requirements, considering only the space an animal needs to sleep and move around. We aim to broaden this perspective in our outdoor Habitat Hunt.



THE FOOD CHAIN

The ultimate source of almost all energy that fuels life on Earth is the sun. (The exception is the relatively minute amount of energy generated through geothermal activity.) The sun creates temperature differentials that drive our wind and air circulation systems, the water cycle, ocean thermal energy power, tidal forces (with help from the moon), and, of course, our food chain.

Only about two percent of the energy reaching us from the sun is used for photosynthesis, but this tiny percentage is what makes it possible for the abundance of living things on Earth to survive. On land, the process begins with plants, and in the water, it usually starts with photosynthetic algae. These autotrophs (or self-

AN INTRODUCTION TO PLANTS AND ANIMALS



AN INTRODUCTION TO PLANTS AND ANIMALS



feeders) are referred to as "producers" since they produce their own food. The energy stored by autotrophs is passed along through the ecosystem in a series of steps of eating and being eaten known as a food chain.

The producers are followed by a host of "consumers," beginning with the plant eaters, or herbivores, which convert energy stored in plant tissue into animal tissue. The herbivores are the energy source for carnivores, the second-level consumers. The final consumer group is made up of decomposers, which capture the energy of dead plant and animal matter, and convert it into nutrients that can be used by plants.

Each trophic (or feeding) level could not exist without the one below it. As the food chain progresses, the trophic levels contain fewer and fewer organisms. No one organism lives entirely by feeding on another; the resources are shared, and the chains interlink to form a food web.

During our food chain exploration, children will hunt for organisms from all of the trophic levels mentioned above. There are an abundance of different plants in this area for hungry consumers to eat! Students will also have the opportunity to catch some herbivorous insects and observe some carnivorous birds. Emphasis will be placed on the concept of a food chain, not the vocabulary involved.



PLANTS & ANIMALS IN THE STREAM ECOSYSTEM

Hawaiian streams are very short and steep compared to those of the U.S. continent. Most fish are found at elevations of 2,600 feet and below. Sudden flooding from storms or from wave action pushing ocean water back up into streams are important factors affecting stream animals. Other factors affecting stream life are sedimentation, stream pollution, water diversion and channelization as well as flooding from heavy rains.

There are no true freshwater fish native to Hawai'i. True freshwater fishes cannot pass saltwater barriers. That is why there are so few families of fish in our streams. Native Hawaiian streamlife, including gobies, shrimp, and snails all arrived at our shores via the ocean, where they spend part of their life cycles. Gobies (*'o'opu*) evolved from an ancestor whose larvae mature in a marine environment. The *'o'opu* are difficult to find in Makiki Stream at the Nature Center due to channelization and diversion downstream.

However, with help from the State's Division of Aquatic Resources, we regularly stock an indoor aquarium with various species of *'o'opu* and sometimes with native freshwater shrimp and snails as well. Students may also catch glimpses of introduced fishes, primarily guppies and swordtails, darting about in the stream.

The largest stream animal students are likely to see is the introduced Tahitian prawn. The prawns use the stream rocks for shelter, but are occasionally seen crawling about the stream floor. The Tahitian prawns prey upon fish, snails, and other smaller crustaceans.

From time to time, frogs take up residence near the stream. They usually hide when they hear people, but very observant children do spot them occasionally. The frogs and fish help control the mosquito population that thrives in Makiki Valley.

Plants are abundant in and around the stream as well. Children will be able to feel soft algae on the rocks in the water, and spongy moss on the rocks on the banks. Plants growing along the banks include wedelia, Job's tears, grasses, and several species of native and Polynesian introduced trees.

Teachers occasionally suggest that we do something to increase the number of animals in the stream to create a more exciting experience for children. We do stock our small stream from time to time, but our efforts are regularly thwarted, either by stormy weather that washes the animals downstream, or by park visitors who come with nets and buckets and leave with prawns and fish. With your help and enthusiasm, we hope to capture students' interest in whatever may be present in the stream on the day of your visit.



SAFETY CONCERNS

While the stream is an exciting place to explore and discover, it does have its hazards. The most common concern is that children will become too rambunctious on the wet rocks and slip and hurt themselves. Our teaching staff will review the rules for stream conduct before we go out. If a child fails to heed safety concerns, s/he will be asked to remain on the bank.

High water levels are another risk we are aware of. Staff are alert to the danger, and regularly monitor the stream. We will cancel the program if we judge stream safety to be a concern. Alternatively, the program will be held, but students will not be allowed direct access to the stream.

A less visible danger that may be present is leptospirosis, a viral infection carried in the wastes of mammals, including rats, mongooses, and pigs. Leptospirosis is a concern in virtually every stream in Hawai'i. People can contract the virus through open wounds, eyes, nose and mouth. Early symptoms are flu-like, but the illness can be fatal if left untreated! Children will be asked to inspect their hands for cuts before venturing into the stream. No one, under any circumstances, should drink the water.

Leptospirosis is a small risk when the stream is moving quickly; it is more of a danger when the water is shallow, warm, and stagnant. Muddy soil near the stream can also harbor the virus. It is very important that children do not put their fingers in their mouths, noses, or eyes, and that they wash their hands well before lunch!

Perhaps the most ferocious animals of the forest are centipedes. They tend to live under rocks or logs. They won't bite unless they are threatened or alarmed. In the Habitat Hunt and Food Chain Challenge, children occasionally find baby centipedes. We will place the first one found in a bug box for all to inspect, and ask that any other centipedes discovered be left alone! This is a very difficult rule for excited



AN INTRODUCTION TO PLANTS AND ANIMALS

children to follow. It might help if you warn them ahead of time that centipede bites can be very painful, and that collecting centipedes is off limits.

The final, predictable danger in the forest is wind. It can appear still and calm on the forest floor, while in the canopy high above, limbs are flailing back and forth. Old or diseased trees can fall with little or no warning to those below! Programs will be canceled on very windy days.

Our staff are well trained and are prepared to handle most emergencies, with your help. First aid kits and telephones are always close at hand. Safety is our first concern, and the information presented here is included to make you aware of the dangers, and help us create a safe, successful program for your class. Please call our office if you have any additional concerns or suggestions.



Sample Letter to Parents

Hawaii Nature Center
Environmental Education Field Program

Grade

1

Dear Parent:

On _____, our class will visit the Hawaii Nature Center in Makiki Valley on an environmental education field excursion. The children will explore a stream, investigate habitats, and find their place in the food chain! Please let your child know that getting dirty is unavoidable at the Nature Center, and should be part of the fun.

On the day of the field trip, please send our child to school with the following:

- A full lunch with beverage (exploring requires energy!). Keep in mind that frozen juices often do not thaw in time for lunch.
- Sneakers that can get muddy.
- Clothes that can get dirty.
- Raingear with a hood or hat.
- Mosquito repellent - please do not apply to face or hands (long sleeved shirts and long pants are the best protection).
- A good night's rest.
- A full stomach from a good breakfast.

If you are joining us as a chaperone, you will need the same things as your child. We ask that in addition to looking out for everyone's safety, you help keep students engaged in the exciting process of discovery! Please be aware that your attitude toward nature...including mud and mosquitos, bugs and slugs...provides a role model for our young students. Please be as positive as you can. Thank you for agreeing to help our on this field trip; we hope it is as fun for you as it is for the keiki!

Hawaii Nature Center reserves all rights to publish the photographs, video footage or letters of program participants, unless requested otherwise in writing. We hope to have a fun, full day in the outdoors. Please call if you have any questions about the field trip.

Aloha,

AN INTRODUCTION TO PLANTS AND ANIMALS





Sunshine in My Lunch

A Hawai'i Nature Center song for First Graders
sung to the tune of "This Old Man"

Chorus

Habitat, habitat
We all need a habitat
With shelter, water, food and space,
We all need a special place.

Food Chain Verse

I have sun, in my lunch
Apples and bananas and juicy fruit punch
It's a sunshine food chain sandwich if you please,
Won't you share a lunch with me!

Stream Verse

At the stream, I can see
Mossy green rocks and pretty red leaves
In the cool, clear water happy as can be,
Fish and insects living free.

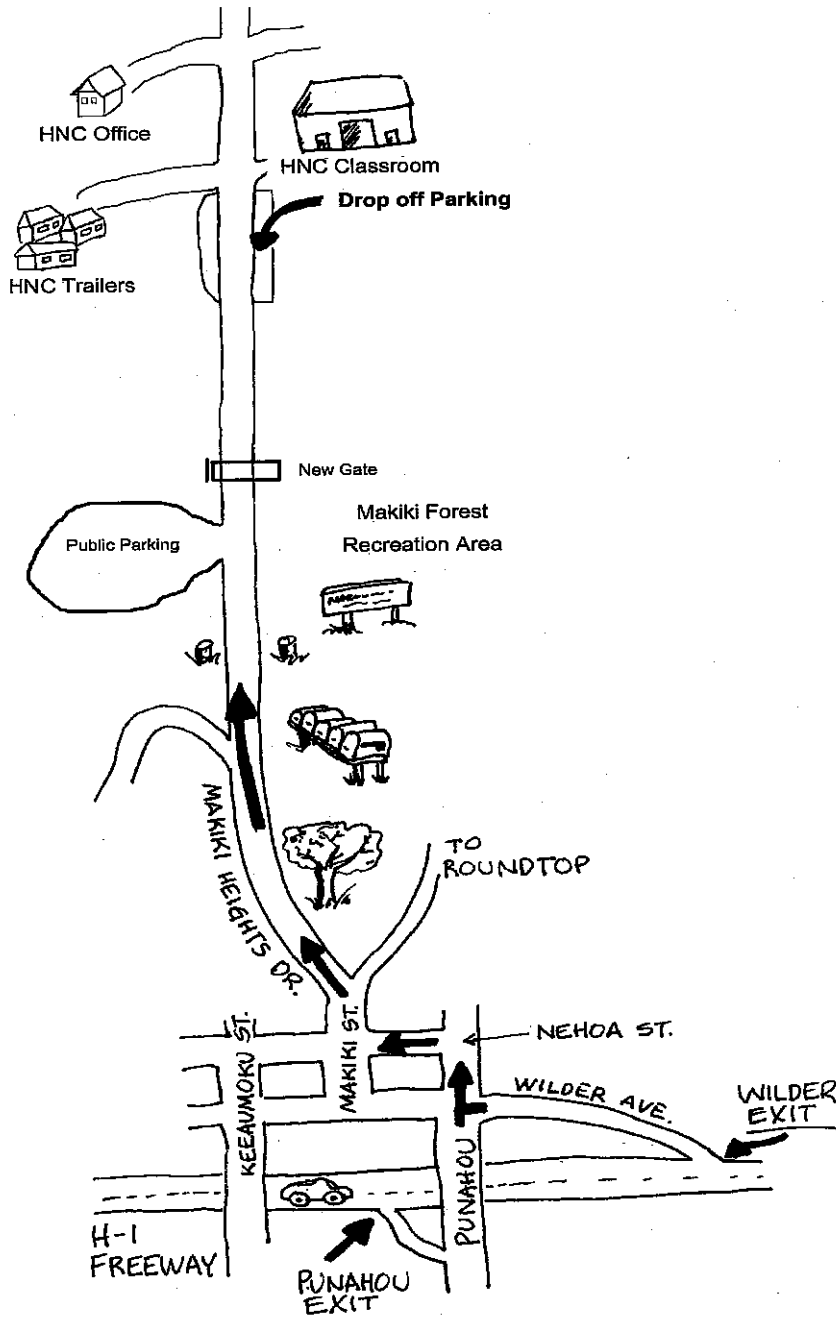
Forest Verse

Here's an ant, there's a snail
So many living things on this trail
Just food, water, shelter, space, can you find all that?
They're all in a habitat!



Map to Field Site

Hawai'i Nature Center
Environmental Education Field Program



AN INTRODUCTION TO PLANTS AND ANIMALS



Recommended References

AN INTRODUCTION TO PLANTS AND ANIMALS



BOOKS & OTHER PUBLICATIONS

- Arrigoni, Ed. *Exploring Nature Safely*. Nature Safety Consultants, 1998. (This reference for educators includes tips on safety and first aid in the outdoors.)
- Asch, Frank. *The Earth and I*. A Gulliver Green Book, Harcourt Brace & Company, 1994. (In this book, a child explains how he and the Earth dance and sing together and take turns listening to each other.)
- Asch, Frank. *Water*. Voyager Books, Harcourt, Inc., 1995. (This picture book simply talks about the many forms of water and why it's important.)
- Au, Joy. *A Bug Hunt in Hawai'i nei*. MnM Press, 2000. (This is a great flap book that helps young children identify some of the bugs they may find in the forest.)
- Bowden, Marcia. *Nature for the Very Young*. John Wiley & Sons, Inc., 1989. (Although designed for a North American environment, this resource includes general concepts and teaching ideas that are appropriate anywhere nature and children co-exist.)
- Carlson, Laurie. *Kid's Create*. Charlotte: Williamson Publishing Co., 1990. (Excellent resource of arts and crafts experiences for ages three to nine.)
- Cohen, Richard and Betty Phillips Tunick. *Snail Trails and Tadpole Tails*. Red Leaf Press, 1993. (Two classroom teachers provided the basis for this fun and easy-to-use guide to nature education in the classroom.)
- Curriculum Research and Development Group. *Dash Curriculum Guide*. University of Hawaii, 1990. (These guides include a variety of short, simple, environment-related activities.)
- Demancehe, Sr., Edna. *Hawaii Nature Study Program*. Curriculum Research and Development Group, 1995. (Several books are included in this set, which provide background information and activity ideas for children.)
- Ehlert, Lois. *Feathers for Lunch*. Orlando: Harcourt Brace Jovanovich, 1990. (This beautifully illustrated story relates the tale of an escaped house-cat's effort to catch a bird...only to end up with feathers for lunch!)
- Erickson, Donna. *Prime Time Together...with Kids*. Minneapolis: Augsburg Fortress, 1989. (This is a delightful collection of games, activities, crafts, and experiments for young children. Many ideas have an environmental bend.)
- Hartley, Karen, Chris Macro, and Philip Taylor. *Ant*. Heinemann Library, 1999. (This children's book features actual photos of ants in their various life cycles and habitats.)



- Hartley, Karen, Chris Macro, and Philip Taylor. *Caterpillar*. Heinemann Library, 1999.
(This children's book features actual photos of caterpillars in their various life cycles and habitats.)
- Hartley, Karen, Chris Macro, and Philip Taylor. *Grasshopper*. Heinemann Library, 1999.
(This children's book features actual photos of grasshoppers in their various life cycles and habitats.)
- Hartley, Karen, Chris Macro, and Philip Taylor. *Spider*. Heinemann Library, 1999.
(This children's book features actual photos of spiders in their various life cycles and habitats.)
- Hayashi, Leslie Ann. *Fables from the Garden*. UH Press, 1998.
- Hayashi, Leslie Ann. *Fables from the Sea*. UH Press, 2000.
- Kalman, Bobbie. *What are Food Chains and Webs?* Crabtree Publishing Company, 1998.
(As part of The Science of Living Things Series, this is a great introductory book on food chains and webs for students.)
- Kilpatrick, Cathy. *Usborne First Nature: Creepy Crawlies*. Usborne Publishing Ltd., 1982.
(This colorful, child-friendly guide to invertebrates includes illustrations and information on pill bugs, centipedes, beetles, earthworms, spiders, and other common animals of the forest floor.)
- Kuhn, Dwight. *My First Book of Nature: How Living Things Grow*. Scholastic Printing, Inc., 1993. (A picture book that looks how living things such as ducks, butterflies, and humans grow.)
- Lee, Robin. *Legends of the Hawaiian Waters*. Makapu'u Press, 1998.
- Lingelbach, Jenepher, ed. *Hands-on Nature, Information and Activities for Exploring the Environment with Children*. Vermont Institute of Natural Science, 1986. (Presents hands-on workshops on adaptations, habitats, cycles, and designs of nature.)
- Luenn, Nancy. *Mother Earth*. New York: Macmillan Publishing Company, 1992. (Beautiful water color illustrations by Neil Waldman bring magic to this simple story of Mother Earth and how we can care for her.)
- Mazer, Anne. *The Salamander Room*. Alfred A. Knopf, 1991. (This beautifully illustrated book recounts the tale of a young boy who brings a salamander home and turns his bedroom into a salamander habitat.)
- Nabham, Gary Paul and Stephen Trimble. *The Geography of Childhood: Why Children Need Wild Places*. Beacon Press, 1994. (This collection of essays written by two fathers and scientists reminds us of the importance of nature in childhood.)



AN INTRODUCTION TO PLANTS AND ANIMALS



- National Gardening Association. *Growing Ideas: A Journal of Garden-Based Learning*. (This publication, filled with classroom ideas and resources for using plants, is free to classroom teachers.) To receive a copy, contact the National Gardening Association, Department of Education, 180 Flynn Av., Burlington, VT 05401, 802/863-1308.
- National Gardening Association. *GrowLab, Activities for Growing Minds*, 1990. (This activity book contains excellent teacher background and hands-on activities.) To receive a copy, contact the National Gardening Association, Department of Education, 180 Flynn Av., Burlington, VT 05401, 802/863-1308.
- Neugebauer, Bonnie, ed. *The Wonder of It: Exploring How the World Works*. Exchange Press, Inc., 1989. (This delightful collection of essays and ideas is aptly subtitled "A Beginnings Book for Teachers of Young Children," and contains a lively and charming assortment of suggestions to help teachers bring the wonder of science into the classroom.)
- Newmann, Dana. *Early Childhood Teacher's Almanac*. West Nyack: The Center for Applied Research in Education, 1984. (A good resource on activities for children for every month of the year.)
- Nishida, Gordon M. and Joann M. Tenorio. *What Bit Me?* University of Hawaii Press, 1993. (Good reference on spiders, centipedes, roaches, mosquitoes, ants and many other invertebrates common in Hawaii.)
- Ohi'a Project Grades K-3*. B.P. Bishop Museum and Moanalua Gardens Foundation, 1991. (Hands-on activities addressing our unique Hawaiian environment are combined with extensive background information in this easy-to-use volume.)
- Ryder, Joanne. *The Snail's Spell*. F. Warne, 1982. (A picture book that allows students to imagine what it would be like if they were snails.)
- Seuss, Dr. *The Lorax*. Random House, 1971. (This classic children's story sends a strong environmental message that we must care for nature or risk losing it.)
- Sheehan, Kathryn and Mary Waidner, Ph.D. *Earth Child*. Council Oak Books, 1991. (This collection of games, stories, and activities for children includes a wonderful variety of nature ideas.)
- The Unhuggables*. National Wildlife Federation, 1988. (Provides information and good photographs of introduced invertebrates found in Hawaii including spiders, scorpions, cockroaches, centipedes, millipedes, mosquitoes, and fleas.)
- What Do Animals See, Hear, Smell, and Feel? National Wildlife Federation, 1990. (This book provides useful information and ideas to expand on activities related to the senses.)

What is a Plant? National Geographic, 1990. (Contains two sets of booklets and activity sheets: "The Parts of a Plant" and "Plants are Important." Wonders of Learning Kit available through the Educational Services catalog.)



WORLD WIDE WEB

Hawaii Department of Land and Natural Resources. www.state.hi.us/dlnr/Welcome.html
(News and information about environmental issues in Hawaii.)

Division of Aquatic Resources: Hawaiian Streams. www.state.hi.us/dlnr/dar/hawn_streams.htm (Information and pictures of native Hawaiian stream animals. Link to Department of Land and Natural Resources home page as well.)

The Nature Conservancy of Hawaii. www.tnc-hawaii.org (Has general information of the natural history of Hawaii.)

Moanalua Gardens Foundation. www.mgf-hawaii.com (Resources about natural Hawaiian history.)

Waikiki Aquarium. www.mic.hawaii.edu/aquarium (Information and links about marine life.)

AN INTRODUCTION TO PLANTS AND ANIMALS

