

Ecology: A Closer Look at the World We Live In

The resources and activities listed in this guide will help create a "window on the world" to increase students' understanding of our complex environment and the critical issues that all nations and people face. With over 6 billion people living on the Earth, and about 80 million more added each year, the population growth is exerting tremendous stress on the environment. The destruction of animal habitats due to human activities worldwide is by far the biggest cause of species extinction. Species are disappearing at the alarming rate of an estimated 30 to 75 per day. Overconsumption of resources by people who live in industrialized countries such as the United States, Japan, and France is a major problem facing future generations. Fossil fuels, lumber, soil, water, and other resources are being used by a fraction of Earth's population but they are being consumed at a rate faster than Nature can replenish them. Pollution from human activities threatens plants and animal habitats, streams and oceans, forests and farms. Insecticides poison our waters while cars and power plants foul the air, both causing permanent global changes.

Understanding the functioning of the environment and the ecological principles is fundamental to our long-term survival. Studying environment and ecology is the ultimate applied science because it is completely interdisciplinary and our understanding, or lack thereof, will inform the decisions we make about managing the earth's resources. These decisions, for better or worse, will determine the quality of our lives in the years ahead and the kind of world future generations will inherit.

These resources will help to provide students with awareness, appreciation, and understanding, and hopefully, a commitment to care about the environment. They can help to encourage creativity and originality in helping to solve some of these critical issues. The organizations listed can provide materials to inspire and empower students to become responsible, productive caretakers of the Earth.

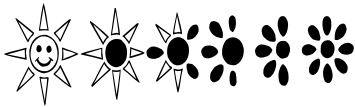
Special Theme: The Earth's Environment

This SEM guide focuses on enriching environmental activities and useful curricular ideas that are designed to increase student and teacher awareness about the state of our fragile planet. The projects and lists of resources presented in this guide are only a small representation of the material that is readily available to today's educators. The enclosed activities are designed for students of all ages and these useful environmental ideas can be incorporated into all areas of the curriculum, including mathematics, language arts, science, social studies, and visual and performing arts. We hope you and your students enjoy these special environmental activities and related resources. We believe that by teaching children how to protect and conserve the Earth's natural resources, we can help insure a safe world, in which they can become effective thinkers, inventors, and problem solvers.

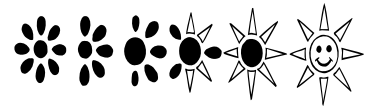
• • • Eco-Challenge • • •

If you lose .25 gallons of water an hour from a leaky faucet, then how much water will you lose in one week? One year?
See page 9 for answers.





Eco-Quests



This list of questions is designed to develop students' critical and creative thinking skills, as well as increase their knowledge about ecology. Students can discuss these questions in small or large groups or use them as springboards for more advanced research projects.

<p>How many creatures live in one handful of compost? How do these critters turn kitchen scraps into nutrient-rich humus?</p> <p>What can manufacturers do to reduce the amount of waste they produce?</p> <p>What would happen if all the world's earthworms died? How would humans be affected by this change?</p> <p>Why are rainforests so important to global ecology? What would happen if they were all destroyed? What external factors currently threaten the survival of today's rainforests?</p> <p>How can forests be used as a sustainable resource? How can forests be economically beneficial without being destroyed?</p> <p>Describe how animals, plants and humans are affected by different kinds of pollution.</p> <p>Why should people recycle? How does recycling benefit humans and the earth?</p> <p>How does air pollution affect weather patterns?</p> <p>How much waste do you produce in one day? What steps can you take to reduce the amount of trash you produce?</p> <p>Why have the populations of many bird species decreased in recent years? Which species are in serious decline? How are humans trying to help these endangered species survive?</p> <p>How do flower and vegetable gardens help the environment? Discuss how they benefit and/or harm humans and wildlife.</p> <p>What laws have been enacted in recent years to protect the environment? Have these laws been effective? If so, how? If not, why not?</p> <p>What is biodiversity? Why is it important to humans and the overall success of the earth?</p>	<p>Describe some ways that plants and animals form partnerships in nature. Are these partnerships successful? If so, how?</p> <p>Describe how one pollutant can affect an entire food chain or ecosystem.</p> <p>Discuss the positive and negative effects of using nuclear power as an energy source.</p> <p>What human actions are responsible for endangering the lives and homes of animals and plants around the world? How can humans reverse their harmful actions?</p> <p>How can humans benefit from the conservation of wildlife?</p> <p>Discuss how nature creates pollution. What are some sources of natural pollution?</p> <p>How does rain turn into acid rain? What effect does acid rain have on the environment? Which human activities are most responsible for causing acid rain? Which areas of the United States are most affected by acid rain? Why? What are some solutions to this problem? How are other nations facing this problem?</p> <p>Why are forests so valuable to humans? How do forests protect water resources, prevent flooding, purify air, and stabilize the world's climate?</p> <p>What is smog? Where is it found? What causes it to occur? How are humans trying to solve the smog crisis?</p> <p>Instead of using chemicals, what other ways can farmers fertilize their fields and remove large pest populations from their farm land?</p> <p>Why is the quality of soil getting worse? How can humans reverse this trend?</p> <p>Describe the role of each member of a food chain. What happens when one or more members of a food chain are removed?</p>	<p>Why are microorganisms so important in the development of an ecosystem?</p> <p>How has human overpopulation affected the world's natural resources and habitats?</p> <p>How are the world's waters getting polluted? How can this pollution be stopped?</p> <p>Discuss the greenhouse effect. How can humans reverse this trend? How can humans reduce the build-up of gases in the atmosphere?</p> <p>What impact will a rise in the earth's temperature have on global weather patterns, sea levels, or growing seasons? What regions of the world will be most affected by global warming?</p> <p>What is meant by <i>environmental racism</i> or <i>environmental discrimination</i>?</p> <p>How has the atmosphere changed over the last fifty years? What factors have affected these changes?</p> <p>Discuss human conservation efforts that have had a positive effect on the earth. What efforts have had a negative effect on the earth?</p> <p>In recent years, what methods have been used to increase the populations of endangered or threatened animal species? Have these efforts been successful? If so, how? If not, why not?</p> <p>When does an animal acquire threatened or endangered status? How do scientists get an accurate count of threatened and endangered plants and animals? What tracking methods do they use?</p> <p>Besides human influences, what natural causes can endanger a species?</p> <p>What environmental problems are caused by the use of fossil fuels as energy sources? Discuss the pros and cons of using renewable energy resources.</p>
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General Ecology Resources

Student Resources

Biodiversity. (1996). Written by Dorothy Hinshaw Patent. Illustrated by William Munoz. Published by Clarion Books. Hardcover. ISBN: 0-395-68704-7. 96 pages. (Ages 9-14). Focusing on the United States and model conservation efforts in Costa Rica, this outstanding publication describes biodiversity and discusses reasons why it's so important to maintain biodiversity in today's world.

Eyewitness Science: Ecology. (1993). Written by Steve Pollock. Published by Dorling Kindersley. Hardcover. ISBN: 1-56458-326-0. 64 pages. (Ages 8 and up). This fantastic resource uses colorful photographs and accurate text to explore the fascinating relationship between animals, plants, humans, energy, and matter. The author discusses various ecological topics including food webs, habitats, transfer of energy, recycling, and human impact on the environment.

Flute's Journey: The Life of a Wood Thrush. (1997). Written by Lynne Cherry. Published by Harcourt Brace and Company. Hardcover. ISBN: 0-15-292853-7. 40 pages. (Ages 4-8). This beautifully-illustrated story takes readers on an exciting journey through the first year of a wood thrush's life—from its hatching in a Maryland forest to its migration across the Gulf of Mexico to the Costa Rican rainforest and back again. Not only does this reverent environmental tale describe the perils faced by today's migratory songbirds (e.g., insects tainted with pesticides and a shrinking habitat), but it also presents a stunning account of the factors that ensure their survival (e.g., instinct, luck, and help from people who are working to protect habitat destruction).

★ **Just a Dream.** (1990). Written by Chris Van Allsburg. Published by Houghton Mifflin Company. Hardcover. ISBN: 0-395-53308-2. 32 pages. (Ages 5-10). This well-written fable offers a plea for environmental action and sends a message of hope for future generations. In this story, a young boy litters and refuses to sort trash for recycling, until he has a dream about an overcrowded and polluted future world. When he awakens from his terrifying nightmare, Walter rearranges his priorities and learns how to become ecologically conscious.



Did You Know?

Aquatic biodiversity is declining four times faster than terrestrial biodiversity.

Kids Who Make A Difference. (1996). Written by Gary Chandler and Kevin Graham. Published by Twenty-First Century Books. Hardcover. ISBN: 0-8050-4625-9. 64 pages. (Ages 10-14). This excellent resource focuses on some of the most innovative and successful environmental programs founded, implemented and run by young people.

★ **The Lorax.** (1971). Written by Dr. Seuss. Published by Random House. Hardcover. ISBN: 0-394-82337-0. 70 pages. (All ages). In this classic story, the Once-ler describes how his greedy actions destroyed a beautiful and thriving environment. Children will enjoy the colorful characters and rhyming verse and adults will appreciate the subtle messages about the negative effects of deforestation, habitat destruction, and air and water pollution.

Mighty Tree. (1992). Written by Dick Gackenbach. Published by Harcourt Brace and Company. Hardcover. ISBN: 0-15-200519-6. 32 pages. (Ages 4-8). This beautifully-illustrated story conveys a timely message about the use and protection of our natural resources. After three trees grow from tiny seeds in the forest, they each face different destinies—one goes to the paper mill, one is used as a Yuletide symbol, and the other becomes shelter for birds, insects and forest creatures.

Mother Earth, Father Sky: Poems of Our Planet. (1995). Selected by Jane Yolen. Illustrated by Jennifer Hewitson. Published by Boyds Mills Press. Distributed by VHPS. Hardcover. ISBN: 1-56397-414-2. 64 pages. (Ages 10 and up). This outstanding collection of poems focuses on the earth's blessings and sacrifices. From C.S. Lewis to Christina Rossetti, this anthology contains the poetic words of thirty-five writers who pay tribute to our fragile world.

Oil Spill! (1994). Written by Melvin Berger. Illustrated by Paul Mirocha. Published by HarperCollins. Paperback. ISBN: 0-06-445121-6. 32 pages. (Ages 5-9). Focusing on the 1989 Exxon *Valdez* oil tanker spill, this book explores why oil spills happen, how experts clean up after them, and what effect spilled oil has on ocean plants and wildlife.

Once There Was a Tree. (1989). Written by Natalia Romanova. Illustrated by Gennady Spirin. Published by Dial Books. Paperback. ISBN: 0-14-054677-4. 32 pages. (Ages 5-9). This inspirational story traces the events that occur after a tree is cut down in the forest—from the animals that visit the stump to the growth of a new seedling. Carefully-detailed illustrations enhance this tale's celebration of an ecosystem's interconnectedness.



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The People Who Hugged the Trees. (1994). Written by Deborah Lee Rose. Illustrated by Birgitta Saflund. Published by Roberts Rinehart Publishers. Distributed by Publishers Group West. Paperback. ISBN: 1-879373-50-5. 32 pages. (Ages 6 and up). This environmental folktale gives readers insight into India's history and culture, while teaching them that their actions can make a difference and that environmental protection is a global concern.

★ **A River Ran Wild: An Environmental History.** (1992). Written by Lynne Cherry. Published by Harcourt Brace and Company. Hardcover. ISBN: 0-15-200542-0. 40 pages. (Ages 6-10). Hundreds of years after the Indians first settled by its banks, the Nashua River in New England became polluted by the toxic wastes of nearby factories and towns. This environmental success story uses insightful narrative and panoramic paintings to describe the history of the Nashua River and illustrate the committed efforts of a few dedicated individuals who restored the waterway to a healthy state.

Song for the Ancient Forest. (1993). Written by Nancy Luenn. Illustrated by Jill Kastner. Published by Atheneum Books. Hardcover. ISBN: 0-689-31719-0. 32 pages. (Ages 4-8). This lyrical conservation tale speaks to the growing concern over the future of the world's old-growth forests. After dreaming about the disappearance of the forests, Raven asks the world's spirit for a song of power to change his dream. When everyone hears this beautiful song, they refuse to heed his warnings, because he is known as a trickster who cannot be trusted. The Raven's hope is finally restored when the logger's young daughter understands the song and helps him spread his message.

A Tree in the Ancient Forest. (1995). Written by Carol Reed-Jones. Illustrated by Christopher Canyon. Published by Dawn Publications. Paperback. ISBN: 1-88322-031-9. 32 pages. (Ages 4-10). This delightful story describes the amazing ways in which a group of forest inhabitants depend upon each other for survival. The author's poetic verse and the illustrator's brilliant close-up paintings perfectly capture the remarkable web of life surrounding a 300 year-old fir tree.

The Vanishing Feast. (1994). Written by Dorothy Hinshaw Patent. Published by Harcourt Brace and Company. Hardcover. ISBN: 0-15-292867-7. 192 pages. (Ages 12 and up). This informative, well-written resource explores the issue of biodiversity, how it is threatened, and how humans can preserve it.

Student Activity Books & Kits

50 Simple Things Kids Can Do To Save the Earth. (1990). The EarthWorks Group. Illustrated by Michele Montez. Published by Andrews McMeel. Paperback. ISBN: 0-8362-2301-2. 156 pages. (Ages 8 and up). This informative handbook shows children how to develop environmentally-sound habits and behaviors. This collection of facts and activities presents information about recycling, preserving water, protecting wildlife, keeping the earth green, spending energy wisely, and sharing eco-friendly advice with others.

Exploring Ecology. Published by Educational Insights. Order Number: EI-5136-7J. (Ages 8 and up). This hands-on kit contains 35 experiments that invite learners to study food webs, endangered animals and habitats, energy sources, recycling, and air, soil, and water pollution. As students explore these aspects of ecology, they will learn about important environmental issues that will play a key role in their future.

I Can Save the Earth: A Handbook for Keeping Earth Healthy and Green. (1993). Written by Anita Holmes. Illustrated by David Neuhaus. Published by Simon and Schuster. Paperback. ISBN: 0-671-74545-X. 96 pages. (Ages 8 and up). This informative guide contains interesting facts, useful illustrations, a glossary, a reading list, and exciting conservation projects that show readers how to take action and preserve the earth's fragile environment. This handbook focuses on ways to protect the earth's air, water, land, plants, and animals.



Ecology Web Sites

★ **E: The Environmental Magazine**
www.emagazine.com

EIC News
www.the-eic.com/news

EnviroLink Home Page
www.envirolinknetforchange.com

Environmental Science Supersite
www.enn.com

The Library-in-the-Sky: Ecology
www.nwrel.org/sky/classroom/science/ecology/ecology.html



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General Ecology Resources

Kid Heroes of the Environment: Simple Things Real Kids Are Doing to Save the Earth. (1991). Written by The EarthWorks Group. Published by EarthWorks Press. Distributed by Publishers Group West. Paperback. ISBN: 1-879682-12-5. 96 pages. (Ages 8 and up). From a boy on a turtle watch to a girl who collects three tons of recyclable materials each month, this excellent resource contains more than 25 inspirational stories about actual kid heroes who are trying to save the earth. In addition to these amazing true accounts, this book also contains tips on how readers can make a difference in their part of the world.

Eco-Simulation

★ **Peterson's Pond.** (1997). Published by Interact. Order Number: 2003L. (Grades 4-8). Using the scientific method, students work in teams to uncover the mystery of why so many creatures in a nearby pond are dying. This simulation invites students to make observations and record them in a journal, use a microscope to view pond samples, determine the pH level of pond water, examine how pollution and water temperature affect pond life, and learn more about a pond's habitat and food web. This simulation includes a teacher's guide and 35 eight-page student guides.

Ecology Software

★ **Decisions, Decisions 5.0: The Environment.** Published by Tom Snyder Productions. Format: Windows/Mac CD-ROM. (Ages 10 and up). Students can use this outstanding computer simulation to learn more about pollution, economics, land use issues, recycling, and local and global environments. After reading the newspaper headlines about Alpine's polluted pond, students jump into the role of mayor and try to remedy the situation by seeking advice from four advisors (a scientist, a campaign manager, an environmentalist, and an economist). Learners gather and analyze data, facts and opinions about the polluted habitat and apply this information to making important social policy decisions.

Earth Explorer. Published by Sunburst Communications. Format: Windows/Mac CD-ROM. (Ages 9-14). This excellent program challenges learners to investigate a wide array of ecology topics and environmental issues. Students can read more than 400 ecology-related articles, view photos and slide shows, watch video clips, play games, complete puzzler activities, listen to presentations on "hot topics" (wetlands, nuclear power, pesticides), and explore graphs and visuals.

★ **Eyewitness Encyclopedia of Nature 2.0.** Published by DK Multimedia. Format: Windows/Mac CD-ROM. (Ages 8 and up). This updated, highly interactive reference uses a stimulating and intuitive visual interface to present a wealth of information about animals, plants, micro-organisms, global climate, ecology, and environmental issues. New features include "build a habitat," an expanded quiz master, and a connection to DK's Nature On-line website.

The Great Ocean Rescue. Published by Tom Snyder Productions. Format: Windows/Mac CD-ROM. (Ages 10-14). This cooperative learning tool invites students to work in small groups and complete four challenging rescue missions involving the world's oceans. Learners work together to gather information that will help them solve ecological problems such as ocean pollution and threatened marine ecosystems. This resource contains text and video/audio footage for the four missions, a library of photographs and short movies, four student reference books, and a teacher's guide with lesson plans, worksheets and activity suggestions.

Ecology Videos

The following companies produce dozens of high-quality science videos. Please contact each company for a complete listing of available ecology titles.

DK Vision

DK Publishing, Inc.
95 Madison Avenue
New York, NY 10016
Phone: (212) 213-4800
Fax: (212) 213-5240

Sea World Education Department

Attn.: Education Materials
500 Sea World Drive
San Diego, CA 92109-7904
Phone: (800) 380-3202
Fax: (619) 226-3634

National Geographic Society

P.O. Box 98199
Washington, DC 20090-8199
Phone: (800) 627-5162

Time Classroom

1271 Avenue of the Americas
Room 25-64
New York, NY 10020
Phone: (212) 522-7526
Fax: (212) 467-1605

★ The Video Project

P.O. Box 77188
San Francisco, CA 94107
Phone: (800)-4-PLANET
Fax: (415) 821-7204

We highly recommend this catalog! This company distributes more than 400 outstanding videos that celebrate the natural world, examine threats to the earth, and offer viable solutions for current and future environmental concerns.



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General Ecology Resources

★ **One Small Square Series.** Published by Virgin Sound and Vision. Format: Windows/Mac CD-ROM. (Ages 7-12). Based on the award-winning books from Scientific American, these interactive adventures invite children to virtually explore the flora and fauna found in one small square of an ecosystem. Learners can manipulate 3-D models and use an electronic magnifying glass to take close-up views of creatures and plants. In addition, children can watch animations and BBC video clips, listen to informative audio tracks, use the nature guide to learn more about specific plant and animal species, play interesting games, conduct science experiments, and organize information in an on-line journal. Available titles include: **Backyard** and **Seashore**.

Outstanding Ecology Series

Earth at Risk Series. Published by Chelsea House Publishers. Hardcover. 112-144 pages. (Ages 10 and up). These well-researched, thought-provoking books are designed to promote discussion and foster a greater understanding of the earth's most pressing environmental problems. Each volume uses striking photographs and well-written narrative to explain the scientific, political, economic, and social issues surrounding current ecological threats such as acid rain, global warming, overpopulation, and toxic materials.

The Environmental ACTION Series. Dale Seymour Publications. (Grades 6-12). This six-module series emphasizes personal responsibility and positive action in conservation efforts and other real-world problems. Each module promotes awareness of an environmental issue through hands-on investigations, encourages practice in issue resolution, helps students build knowledge and skills, shows students how to become responsible citizens through community involvement, studies the consequences of human decisions, and examines the influence of laws and policies. Each module includes a student edition and a teacher resource guide featuring teacher suggestions, background information, preparation tips, blackline masters, assessment tools, and a resource directory.

Global Environmental Change Series. Published by National Science Teachers Association. 64 pages. (Ages 14 and up). NSTA and EPA designed this new series to introduce students to real-world applications of environmental science. Each volume contains background information and challenging activities that link a global environmental topic such as biodiversity and deforestation directly to students' own experiences.

★ **One Small Square Series.** Published by McGraw-Hill. Paperback. 48 pages. (Ages 6-9). This critically-acclaimed nature series invites learners to explore a small cross-section of an ecosystem and its inhabitants. As children take an up-close look at each habitat, they will encounter a variety of wildlife including animals, plants, insects, birds, fish, amphibians, and micro-organisms. Each title contains stunning, full-color illustrations, a collection of motivating experiments and activities, informative text, clear diagrams, safety tips, a picture glossary, and a resource list.

Our Endangered Planet Series. Published by Lerner Publications. Hardcover. 64-72 pages. (Ages 9 and up). These noteworthy books examine important environmental topics in detail, with an emphasis on causes and solutions. Each title contains engaging text, full-color photographs, charts, helpful addresses, and suggestions for improving the environment.

Our Fragile Planet Series. Published by Facts on File. Hardcover. 128 pages. (Ages 10-14). This excellent series provides a good introduction to some of today's most critical environmental problems—endangered habitats, food and water shortages, shrinking forests, threatened oceans, and the waste crisis. Each volume closely examines one environmental issue and offers recommended plans of action. These books contain scientifically-accurate text, full-color and black-and-white photographs, illustrations, maps, charts, bibliographies, and glossaries.

Overview Series: Our Endangered Planet. Published by Greenhaven Press. Hardcover. 80-128 pages. (Ages 10 and up). This series discusses contemporary environmental issues that are threatening the survival of humans and many other plant and animal species on earth. Each volume contains clear photographs, relevant illustrations, provocative editorial cartoons, informative text, a bibliography, a glossary, and helpful addresses.

Restoring Nature—Success Stories. Published by Children's Press. Hardcover. 96 pages. (Ages 9-12). This remarkable series describes positive ways that people can help the earth's environment and endangered species. Each volume contains colorful photographs, fascinating text, helpful addresses, a collection of success stories, and practical tips designed to help readers find constructive ways to improve the quality of life on this planet.



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Saving Planet Earth Series. Published by Children's Press. Hardcover. 128 pages. (Ages 12-14). This timely series discusses current threats to the environment and provides practical ideas for creating an earth that is safe, productive and beautiful for all its inhabitants. Each title contains informative text, full-color and black-and-white photographs, interesting facts, and helpful suggestions for taking action against ecological perils such as acid rain, global warming, hazardous waste, oil spills, and vanishing forests.

Young Discoverers: Environmental Facts and Experiments. Published by Kingfisher. Distributed by Raintree Steck-Vaughn. Hardcover. 32 pages. (Ages 6-9). Each volume in this series contains a collection of fascinating facts and hands-on activities that introduce children to important environmental concepts (e.g., renewable energy, recycling, endangered habitats, and pollution). These interesting books provide step-by-step experiments and projects, accompanied by instructive visuals and full-color illustrations and photographs.

Teacher Resources

Environmental Science Activities Kit: Ready-to-Use Lessons, Labs & Worksheets for Grades 7-12. (1993). Written by Michael L. Roa. Published by the Center for Applied Research in Education. Spiral Paperback. ISBN: 0-87628-304-0. 352 pages. (Grades 7-12). This resource contains detailed lessons, labs and worksheets that focus on current environmental issues such as land use, wildlife, and energy. In addition to excellent project ideas, this guide also includes background information, materials lists, safety checklists, and reproducible student pages.

Explorations in Backyard Biology: Drawing on Nature in the Classroom. (1996). Written by R. Gary Raham. Published by Teacher Ideas Press. Paperback. ISBN: 1-56308-254-3. 204 pages. (Grades 4-6). This resource invites learners to read brief descriptions about fascinating creatures, participate in hands-on nature explorations, and record their experiences in a naturalist's notebook. Exciting classroom and field activities focus on four areas of life science: size, scale and the world of the very small; predator-prey relationships among animals; animal communication; and the ecology of living communities.

Global Warming & The Greenhouse Effect. (1990). Written by Colin Hocking, Cary Sneider, John Erickson, and Richard Golden. Published by Lawrence Hall of Science. Paperback. ISBN: 0-912511-75-3. 184 pages. (Grades 7-10). This outstanding guide contains a collection of challenging student activities that invite learners to explore the controversial topic of global warming in a variety of ways (e.g., hands-on science activities, experiments, and simulation games). In addition to presenting scientific theories and evidence about global warming, this book also tries to help students view this environmental problem from different points of view.

Learning from the Land: Teaching Ecology Through Stories and Activities. (1997). Written by Brian "Fox" Ellis. Illustrated by Deborah Wallen. Published by Teacher Ideas Press. Paperback. ISBN: 1-56308-563-1. 150 pages. (Grades K-12). This unique resource uses a collection of stories, hands-on science experiments and creative-writing activities to introduce students to different scientific concepts.

Nature at Your Doorstep: Real World Investigations for Primary Students. (1997). Written by Carole G. Basile, Fred Collins, and Jennifer Gillespie-Malone. Illustrated by Sabra Booth. Published by Teacher Ideas Press. Paperback. ISBN: 1-56308-455-4. 162 pages. (Grades K-3). This collection of activities invites primary students to venture into their own school yard to learn more about the intricacies of nature and the environment. Using the scientific method as a tool for learning, youngsters can explore different areas of ecology such as birds, habitats, and biodiversity. Each investigation encourages learners to formulate hypotheses, collect observational data, analyze findings, and draw conclusions. This resource contains background information, reproducible pages, interdisciplinary activity ideas, and assessment suggestions.

This Planet Is Mine: Appreciating the Earth Through Thematic Units, Literature and Activities. (1994). Written by Dianna Dee Damkoehler with Helen Gehrenbeck. Published by Scholastic. Paperback. ISBN: 0-590-48794-9. 112 pages. (Grades K-2). This unique resource contains 15 exciting environmental theme units that focus on different areas of ecology (e.g., monarch butterflies, Native Americans, wolves, prairies, rainforests, and bears). This book contains fun facts, cross-curricular activities, book links, photographs, and student samples.



Celebrate Earth Day Every Day!

General Ecology Resources



Eco-Biographies

The following remarkable biographies highlight the accomplishments and environmental contributions of the world's most famous conservationists, ecologists, naturalists, and "earth lovers."

Gaylord Nelson: A Day for the Earth. (1992). Written by Jeffrey Shulman and Teresa Rogers. Illustrated by Larry Raymond. Published by Twenty-First Century Books. Hardcover. ISBN: 0-941477-40-1. 68 pages. (Ages 9-12).

Gifford Pinchot: American Forester. (1996). Written by Peter Anderson. Published by Franklin Watts. Paperback. ISBN: 0-531-15760-1. 64 pages. (Ages 9-12).

Jane Goodall: Living with the Chimps. (1992). Written by Julie Fromer. Illustrated by Antonio Castro. Published by Twenty-First Century Books. Hardcover. ISBN: 0-8050-2116-7. 72 pages. (Ages 9-12).

John Burroughs: The Sage of Slabsides. (1997). Written by Ginger Wadsworth. Published by Clarion Books. Hardcover. ISBN: 0-395-77830-1. 112 pages. (Ages 9 and up).

John James Audubon: Wildlife Artist. (1996). Written by Peter Anderson. Published by Franklin Watts. Paperback. ISBN: 0-531-15762-8. 64 pages. (Ages 9-12).

John Muir: Wilderness Prophet. (1996). Written by Peter Anderson. Published by Franklin Watts. Paperback. ISBN: 0-531-15781-4. 64 pages. (Ages 9-12).

John Muir: Wilderness Protector. (1992). Written by Ginger Wadsworth. Published by Lerner Publications. Hardcover. ISBN: 0-8225-4912-3. 144 pages. (Ages 10 and up).

Rachel Carson: Pioneer of Ecology. (1988). Written by Kathleen V. Kudlinski. Illustrated by Ted Lewin. Published by Penguin. Paperback. ISBN: 0-14-032242-6. 64 pages. (Ages 8-12).

Rachel Carson: Voice for the Earth. (1992). Written by Ginger Wadsworth. Published by Lerner Publications. Hardcover. ISBN: 0-8225-4907-7. 128 pages. (Ages 10 and up).

Reduce • Reuse • Recycle



Sponsor a Book Swap. Invite students to bring in their favorite used books and have them swap reading materials with other interested classmates.

Excellent Biography Collections

American Profiles: Naturalists, Conservationists, and Environmentalists. (1994). Written by Eileen Lucas. Published by Facts On File. Hardcover. ISBN: 0-8160-2919-9. 160 pages. (Ages 10 and up). This volume profiles ten Americans who have worked hard to understand, document, and protect America's natural wilderness.

★ **Eco-Women: Protectors of the Earth.** (1996). Written by Willow Ann Sirch. Published by Fulcrum Publishing. Paperback. ISBN: 1-55591-252-4. 96 pages. (Ages 8-12). This excellent title presents lively portraits of nine exceptional women who have been instrumental in the environmental movement throughout the world.

The Environmentalists. (1993). Written by Alan Axelrod and Charles Phillips. Published by Facts On File. Hardcover. ISBN: 0-8160-2715-3. 272 pages. (Ages 12 and up). This comprehensive reference contains more than 600 profiles of individuals and groups who have had a major impact on the environment.

Global Profiles: Contemporary Environmentalists. (1996). Written by Kevin Graham. Published by Facts On File. Hardcover. ISBN: 0-8160-3222-X. 128 pages. (Ages 10 and up). This collection of thought-provoking essays describes the lives and achievements of ten contemporary environmentalists who have made a lasting impression on the world.

★ **Great Lives: Nature and the Environment.** (1991). Written by Doris and Harold Faber. Published by Atheneum Books. Hardcover. ISBN: 0-684-19047-8. 288 pages. (Ages 9-12). This outstanding resource profiles twenty-five environmental leaders including John Muir, Rachel Carson, Henry David Thoreau, John James Audubon, and Jacques-Yves Cousteau.

Check Out This Outstanding Picture Book!

★ **Brother Eagle, Sister Sky: A Message from Chief Seattle.** (1993). Illustrated by Susan Jeffers. Published by Dial Books. Hardcover. ISBN: 0-8037-0969-2. 32 pages. (Ages 5-10). In this remarkable book, a Native American chief shares his message about the importance of treating the earth and all its creatures with kindness and respect. In addition to this strong message, spirited illustrations also convey the interconnectedness of nature and the need for humans to approach the natural environment with humility and reverence.



SEM News Spotlight

The Rainforest • The Rainforest • The Rainforest



A patch of rainforest measuring four square miles typically has about 125 mammal species, 400 bird species, 100 reptile species, 60 amphibian species, 150 butterfly species, and more insect species than a person could count.

CD-ROMS

Amazon Trail III. Published by MECC/The Learning Company. Format: Windows/Mac. (Ages 10 and up). This compelling interactive adventure invites learners to explore the Amazon River and its surrounding rainforests. During this exciting journey, children travel by canoe from the mouth of the Amazon to its head-waters in Andes high country, searching for a tropical cure that can save the ancient Incas from malaria. Throughout this multimedia simulation, students encounter fascinating historic figures (naturalists, scientists, explorers) and rainforest wildlife.

★ **The Magic School Bus Explores the Rainforest.**

Published by Microsoft. Format: Windows. (Ages 6-10). With Ms. Frizzle at the wheel, youngsters can jump on board the famous magic school bus and take a rollicking ride through a Costa Rican rainforest. This excellent program uses a well-organized multimedia presentation (including maps, interesting facts, games, reports, demonstrations, and stories) to introduce learners to the animals and plants that inhabit different layers of the rainforest. As children explore this diverse ecosystem, they can also help Ms. Frizzle find the missing bio-clones for the rainforest toolbox.



ANSWERS

Eco-Challenge (Page 1) One week (42 gallons).
One year (2,184 gallons).

Worm Trivia (Page 12) 1. Twelve. 2. Smell. 3. 300. 4. Thirty-six. 5. Skin. 6. Oligochaetologist.

What's Missing? (Page 31) 1. Pesticide. 2. Automobile Exhaust. 3. Chlorofluorocarbons. 4. Household Cleaners. 5. Fertilizer. 6. Litter.

SimIsle: Missions in the Rainforest. Published by Maxis/Electronic Arts. Format: Windows/Mac. (Ages 14 and up). This exciting computer simulation invites learners to embark on challenging missions that ask them to strike a balance between the rainforest's economic progress and the protection of its natural resources. As players build, protect and/or explore this equatorial paradise, they will encounter land developers, poachers, movie crews, villagers, terrorists, endangered species, natural disasters, and other potential hazards.

Student Resources

Bats, Bugs, and Biodiversity: Adventures in the Amazonian Rain Forest. (1995). Written by Susan Goodman. Photographs by Michael Doolittle. Published by Atheneum Books. Hardcover. ISBN: 0-689-31943-6. 48 pages. (Ages 8-12). This photo-essay records the experiences of a group of seventh graders from western Michigan who participated in a special workshop in the Peruvian Amazon Rain Forest. During their visit, they learned about biodiversity and native wildlife, paddled canoes on the longest river in the world, swung on vines, sipped from coconuts, and bartered with the natives.

Destination: Rain Forest. (1997). Written by Jonathan Grupper. Published by the National Geographic Society. Distributed by Publishers Group West. Hardcover. ISBN: 0-7922-7018-5. 32 pages. (Ages 6 and up). This striking book uses colorful, close-up photography and interesting narrative to describe the diversity of life existing in today's tropical rainforests. From the forest floor to the canopy, this resource accurately highlights some of the many plants and animals living in each layer of rainforest.

Exploring the Rain Forest: Science Activities for Kids. (1996). Written by Anthony D. Fredericks. Illustrated by Shawn Berlute-Shea. Published by Fulcrum Publishing. Paperback. ISBN: 1-55591-304-0. 120 pages. (Ages 8-12). With this unique resource, children can take a magical journey deep into the heart of the world's rainforests and learn firsthand about this incredible ecosystem. This activity book contains hands-on activities, unbelievable facts, amazing discoveries, and fantastic experiments that focus on exploring different aspects of rainforest life.



SEM News Spotlight

The Rainforest • The Rainforest • The Rainforest



Fernando's Gift: El Regalo de Fernando. (1995). Written by Douglas Keister. Published by Sierra Club. Distributed by Little Brown. Hardcover. ISBN: 0-87156-414-9. 32 pages. (Ages 5-8). This colorful picture book uses brilliant photographs and bilingual text (English and Spanish) to tell the story of a young Costa Rican boy who discovers that a favorite rainforest tree has been cut down.

★ **Flashy Fantastic Rain Forest Frogs.** (1997). Written by Dorothy Hinshaw Patent. Illustrated by Kendahl Jan Jubb. Published by Walker & Company. Hardcover. ISBN: 0-8027-8615-4. 32 pages. (Ages 5-8). Fascinating factoids and stunning illustrations leap off the pages of this captivating book about rainforest frogs. Readers will enjoy this well-written resource which contains accurate information and colorful end papers.

The Great Kapok Tree: A Tale of the Amazon Rain Forest. (1990). Written by Lynne Cherry. Published by Harcourt Brace and Company. Hardcover. ISBN: 0-15-200520-X. 32 pages. (Ages 4-8). In this modern fable, a man enters the Brazilian rainforest to chop down a great kapok tree. Exhausted from his labors, he puts down his ax and falls asleep at the foot of the tree. During his slumber, the rainforest animals emerge one-by-one and plead with him not to destroy their world. When the man wakes up, he notices the beauty of the rainforest and its creatures and decides to spare the tree.

How Monkeys Make Chocolate: Foods and Medicines from the Rainforests. (1995). Written by Adrian Forsyth. Published by Owl Books. Distributed by Firefly Books. Paperback. ISBN: 1-895688-32-9. 48 pages. (Ages 9 and up). Designed like a glossy magazine, this volume provides a wealth of colorful photographs and factual information about the world's rainforests—truly rich ecosystems with unique plants, animals and humans, all dependent on each other for survival.

Jaguar in the Rain Forest. (1996). Written by Joanne Ryder. Illustrated by Michael Rothman. Published by William Morrow. Hardcover. ISBN: 0-688-12990-0. 32 pages. (Ages 5-8). This colorful picture book invites readers to imagine what life would be like as a mighty jaguar in the rainforest—prowling around the forest floor, crossing rivers, filling the darkness with a deep growl, and silently stalking prey. Magnificent paintings of this unique rainforest creature perfectly complement the author's blend of scientific facts and poetic prose.

Jaguarundi. (1995). Written by Virginia Hamilton. Illustrated by Floyd Cooper. Published by Scholastic, Inc. Hardcover. ISBN: 0-590-47366-2. 40 pages. (Ages 5-12). In Virginia Hamilton's first picture book, a shy rainforest cat and a group of endangered animals try to survive the destruction of their rainforest home and struggle to find a new jungle habitat. This resource contains a visual glossary and descriptions of each animal featured in the story.

Journey of the Red-Eyed Tree Frog. (1992). Written by Tanis Jordan. Illustrated by Martin Jordan. Published by Simon & Schuster. Hardcover. ISBN: 0-671-76903-0. 40 pages. (Ages 4-8). In this tale, a tree frog embarks on a journey to keep people from burning the rainforest and encounters many endangered animal friends along the way. Beautiful jewel-toned illustrations and thoughtful narrative perfectly capture the diversity of life in the rainforest, while sending a strong message about the need to stop rainforest destruction.

Life in the Rain Forests: Animals, People, Plants. (1997). Written by Lucy Baker. Published by World Book, Inc. Paperback. ISBN: 0-7166-5205-6. 32 pages. (Ages 7-11). This volume uses beautiful photographs and thought-provoking text to introduce readers to the diverse inhabitants of the world's rainforests. The author accurately describes the important relationship between tropical plants, animals and people and offers suggestions for repairing these damaged ecosystems.

The Most Beautiful Roof in the World: Exploring the Rainforest Canopy. (1997). Written by Kathryn Lasky. Photographs by Christopher G. Knight. Published by Harcourt Brace and Company. Hardcover. ISBN: 0-15-200893-4. 48 pages. (Ages 6-12). Readers join Meg Lowman, a scientist who has spent years studying the rainforest, as she navigates suspended walkways to explore one of the earth's least accessible and most fascinating ecosystems—the rainforest canopy. From the treetops in Belize, Meg studies and records the wonders of plant and animal life found more than 100 feet above the rainforest floor.

Nature's Green Umbrella: Tropical Rain Forests. (1994). Written and illustrated by Gail Gibbons. Published by William Morrow. Hardcover. ISBN: 0-688-12353-8. 32 pages. (Ages 8-10). This beautifully-illustrated book introduces readers to one of the world's most complex ecosystems. The author discusses the importance of rainforests to the global ecology and explores related preservation and conservation issues.



SEM News Spotlight

The Rainforest • The Rainforest • The Rainforest



★ **One Day in the Tropical Rain Forest.** (1990). Written by Jean Craighead George. Illustrated by Gary Allen. Published by HarperCollins. ISBN: 0-06-442016-7. 64 pages. (Ages 7-10). This magical story takes readers on an unforgettable journey through the wonderful tropical landscape of the rainforest. In order to stop the tragic destruction of his beloved home by a caravan of bulldozers, a young Indian boy, named Tepui, helps a visiting scientist search for a nameless butterfly. Other titles in this ecological series include: **One Day in the Alpine Tundra** (ISBN: 0-06-442027-2), **One Day in the Desert** (ISBN: 0-06-442038-8), **One Day in the Prairie** (ISBN: 0-06-442039-6), and **One Day in the Woods** (ISBN: 0-06-442017-5).

Rain Forest Babies. (1996). Written by Kathy Darling. Photographs by Tara Darling. Published by Walker & Company. Hardcover. ISBN: 0-8027-8411-9. 32 pages. (Ages 4-8). This delightful volume uses lively prose and close-up photography to introduce readers to adorable newborn animals living in the world's lush rainforests. From 300-pound baby elephants to tiny jewel-like poisonous frogs, youngsters will enjoy learning about these adorable tropical babies.

Rain Forest Secrets. (1990). Written by Arthur Dorros. Published by Scholastic, Inc. Hardcover. ISBN: 0-590-43369-5. 40 pages. (Ages 6-9). This fascinating resource invites young environmentalists to take a closer look at one of the world's most important and endangered ecosystems.

★ **Rain Forests and Reefs: A Kid's-Eye View of the Tropics.** (1997). Written by Caitlin and Thane Maynard and Stan Rullman. Published by Franklin Watts. Paperback. ISBN: 0-531-15806-3. 64 pages. (Ages 8-14). The fourteen-year old author and her father present a scrapbook of their trip to Belize with the Cincinnati Zoo's Junior Zoologists Club. This unique resource uses journal entries, postcards, word definitions, color photographs, and profiles of naturalists to introduce readers to the diversity of life found in tropical rainforests and coral reefs.

★ **A Walk in the Rainforest.** (1992). Written and illustrated by Kristin Joy Pratt. Published by Dawn Publications. Paperback. ISBN: 1-878265-53-9. 32 pages. (Ages 4-12). This remarkable alphabet book provides a colorful, stimulating way to explore the exotic plants and animals inhabiting tropical rainforests. Each page contains a full-color illustration accompanied by a paragraph of intriguing facts about the animal or plant's characteristics and habitat.

Welcome to the Green House. (1993). Written by Jane Yolen. Illustrated by Laura Regan. Published by Putnam. Hardcover. ISBN: 0-399-22335-5. 32 pages. (Ages 4-8). This colorful introduction to rainforest ecology uses poetic verse and evocative images to explore the plants, trees, insects, birds, and animals living in this rich ecosystem.

Rainforest Web Sites

Great Bear Rainforest Ecology
www.fanweb.org/gcr.htm

Rainforest Action Network Info Center
www.ran.org/ran/info_center/index.html

Science in the Rainforest
www.pbs.org/tal/costa_rica/registered.html

Set Up A Recycling Program

1. Recruit a recycling team composed of teachers, administrators, students, parents, and custodial staff. Once the team is assembled, contact your community's solid waste management office and research the answers to the following questions:
 - Which materials can your school recycle?
 - Where will the recycled items go for processing?
 - Who is responsible for removing the recycled items from the school and transporting them to the local recycling area?
 - How will you pay for the program?
2. Find out how much recyclable material is currently being thrown away at your school. This will give you a better idea of how much material you will be dealing with and what size collection bins you will need.
3. Decide how to finance the recycling program—through fundraisers, school funds, or donations from local businesses.
4. Purchase or make collection bins and place them in a convenient location. Make sure all participants know where and when to recycle certain items.
5. Publicize your recycling program to generate community support. Hold a rally, put information in the school or local newspaper, put up informational displays and bulletin boards, or sponsor a poster contest to promote recycling.



SEM News Spotlight

Our Endangered World • Our Endangered World



This list of resources focuses on the world's endangered animals, plants and people.

Student Resources

All The King's Animals: The Return of Endangered Wildlife to Swaziland. (1994). Written and photographed by Cristina Kessler. Published by Boyds Mills Press. Distributed by VHPS. Hardcover. ISBN: 1-56397-364-2. 64 pages. (Ages 8-12). This fascinating book uses clear text and colorful photos to document the work of Ted Reilly, a conservationist who has worked diligently over the past thirty years to return wildlife to Swaziland, a country in south Africa. Facing obstacles such as drought, dangerous poachers, and wild animals, Ted managed to increase various animal populations including elephants, hippopotamuses, impala, lions, and rhinoceroses.

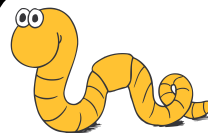
Animals You Never Even Heard Of. (1997). Written by Patricia Curtis. Published by Sierra. Distributed by Little Brown. Hardcover. ISBN: 0-87156-594-3. 32 pages. (Ages 5-8). This book introduces readers to twelve unfamiliar endangered creatures living in the wild. Each animal has a double-page spread featuring a full-page color photograph and a page of text describing its habitat and unique characteristics. This resource also includes information on each animal's status in the wild and reasons why it is in danger of extinction.

Back to the Wild. (1997). Written by Dorothy Hinshaw Patent. Photographs by William Munoz. Published by Harcourt Brace and Company. Hardcover. ISBN: 0-15-200280-4. 80 pages. (Ages 8-12). This amazing volume profiles four endangered animal breeding programs that strive to reintroduce animals back into the wild. The author describes efforts to reestablish the golden lion tamarins of Brazil, the red wolves of the American Southeast, the lemurs of Madagascar, and the black-footed ferrets of the American West.

Can We Save Them? Endangered Species of North America. (1997). Written by David Dobson. Illustrated by James M. Needham. Published by Charlesbridge Publishing. Hardcover. ISBN: 0-88106-823-3. 32 pages. (Ages 5-9). This resource uses captivating text and breathtaking illustrations to introduce readers to twelve species of endangered plants and animals. The author discusses the physical characteristics, habits, and natural habitat of each species and provides insight into current threats and possible protective measures.

★ **Extremely Weird Endangered Species.** (1996). Written by Sarah Lovett. Published by John Muir Publications. Distributed by Publishers Group West. Paperback. ISBN: 1-56261-280-8. 32 pages. (Ages 6-12). This interesting resource teaches children about unusual endangered creatures, such as the California Condor and the Giant Armadillo. In addition to full-color photographs, entertaining illustrations, informative descriptions, a glossary, and a taxonomy chart, this title also contains helpful advice for young readers who are interested in helping these threatened species survive on earth.

★ **Will We Miss Them? Endangered Species.** (1991). Written by Alexandra Wright. Illustrated by Marshall Peck III. Published by Charlesbridge Publishing. Hardcover. ISBN: 0-88106-489-0. 32 pages. (Ages 4-8). This colorful, well-written book presents fascinating facts about fourteen endangered species from around the world. In addition to introducing readers to the lives of these threatened animals, the author also includes information about the challenges they face on a daily basis. This book is also available on CD-ROM. (ISBN: 1-57288-106-3).



The Mighty Earthworm

See page 19 for a list of resources based on this fascinating garbage gobbler!

Worm Trivia

1. Night crawlers can live to be ____ years old.
2. Earthworms have a strong sense of ____.
3. One worm has ____ kidneys.
4. One earthworm can digest ____ tons of soil in one year.
5. Earthworms breathe through their ____.
6. A worm expert is called an _____.

See page 9 for answers.



SEM News Spotlight

Our Endangered World • Our Endangered World



Outstanding Series

Endangered! Published by Benchmark Books. Hardcover. 32 pages. (Ages 8 and up). This relevant series highlights the endangered animals of the world and discusses the high number of species that are currently at risk of extinction. Each volume contains full-color photographs, maps, and up-to-date information about each animal's physical characteristics, location, habitat, hunting and eating habits, breeding behaviors, and social interactions. In addition to discussing each animal's current status, these books also address what steps are being taken to help each species survive and what the future holds for these endangered animals.

★ **Endangered Animals.** Published by Crabtree Publishing Company. Paperback. 32 pages. (Ages 6-14). Each title in this series uses clear, simple text and stunning, full-color illustrations to introduce readers to ten endangered animals from a specific habitat (e.g., wetlands, forest, ocean, desert). These books discuss reasons why certain animals have become endangered and offer suggestions for preserving the future of these threatened wildlife species.

Endangered People and Places Series. Published by Lerner Publications. Hardcover. 48 pages. (Ages 9-12). This intriguing series examines the world's remaining wilderness areas and the native people who inhabit them. The authors address the problems facing these endangered regions and discuss the steps being taken to prevent their destruction. Each volume contains interesting text, full-color photographs, maps, illustrations, a comprehensive glossary, and an index guide.

The Environmental Atlas Series. Published by Facts on File. Hardcover. 64 pages. (Ages 9-14). This attractive series uses colorful maps, symbols, photographs, and lively text to explore the world's endangered animals, places, people, and resources. Each compelling title tracks environmental issues that are crucial to specific regions and countries around the world.



Endangered Species Web Sites

EE-Link: Endangered Species
www.nceet.snre.umich.edu/EndSpp/Endangered.html

The International Wolf Center
www.wolf.org

Office of Protected Resources
kingfish.ssp.nmfs.gov/tmcintyr/prot_res.html

Orangutan Foundation International
www.ns.net/orangutan/index1.html

SOS Rhino
www.sosrhino.org

Ecology Magazines

Dolphin Log. Published by the Cousteau Society. 6 issues a year. Ages 7-13.

EarthSavers. Published by the National Wildlife Federation. Free subscription, 4 issues a year. Ages 6-13.

★ **KIND News.** Published by the National Association for Humane & Environmental Education. 9 issues a year. Ages 5-12.

★ **Owl: The Discovery Magazine for Kids.** Published by the Young Naturalist Foundation. 10 issues a year. Ages 8-12.

Ranger Rick. Published by the National Wildlife Federation. 12 issues a year. Ages 7-12.

Your Big Backyard. Published by the National Wildlife Federation. 12 issues a year. Ages 3-6.

★ **ZooBooks.** Published by Wildlife Education Ltd. 12 issues a year. Ages 5-14.



Reduce • Reuse • Recycle



Let's Talk Trash!

Student Resources

Garbage! The Trashiest Book You'll Ever Read. (1993). Written by Suzanne Lord. Published by Scholastic, Inc. Paperback. ISBN: 0-590-46024-2. 112 pages. (Ages 8-12). This timely book discusses the past, present and future of one of the nation's biggest problems and provides suggestions for cleaning up the environment.

★ **The Great Trash Bash.** (1991). Written by Loreen Leedy. Published by Holiday House. Hardcover. ISBN: 0-8234-0869-8. 32 pages. (Ages 5-8). In this colorful picture book, the mayor of Beaston talks to his neighbors about solving their garbage problems and institutes a Trash Bash—a cooperative effort to make their town a more beautiful place to live.

★ **The Wartville Wizard.** (1986). Written by Don Madden. Published by Aladdin Books. Paperback. ISBN: 0-689-71667-2. 32 pages. (Ages 5-10). In this humorous ecology tale, a tidy old man, tired of picking up everyone's garbage around town, gains the power over trash and commands each piece of litter to stick to the person who threw it. When most of the citizens of Wartville become covered in trash, they decide to confront the wizard and express their anger towards his strange power. During this meeting, the trash-clad citizens notice how silly they look and promise to remedy their litterbug habits once and for all.

Where Does the Garbage Go? (1974, 1994). Written by Paul Showers. Illustrated by Randy Chewning. Published by HarperCollins. Paperback. ISBN: 0-06-445114-3. 32 pages. (Ages 5-9). This simple introduction to garbage uses facts, graphs, charts, and diagrams to explain how people create too much waste and what happens to solid waste once it reaches landfills and recycling centers. The author also includes tips on how to reduce trash.



Recycling Web Sites

Global Recycling Network
gm.com

The Internet Consumer Recycling Guide
www.obviously.com/recycle

Recycle City
www.epa.gov/recyclecity

Recycling World
www.tecweb.com/recycle/rwcont.htm

US Environmental/Recycling Hotline
www.1800cleanup.org

Just Recycle It!

Student Resources

Recycle! A Handbook for Kids. (1992). Written by Gail Gibbons. Published by Little Brown. Paperback. ISBN: 0-316-30943-5. 32 pages. (Ages 4-8). This useful introduction explains the process of recycling from start to finish and discusses how and why paper, glass, aluminum cans, and plastic are recycled into new products. Young readers will appreciate this collection of interesting facts and practical ideas.

Recycling. (1996). Written by Gary Chandler and Kevin Graham. Published by Twenty-First Century Books. Hardcover. ISBN: 0-8050-4622-4. 64 pages. (Ages 10-14). Focusing on new developments in recycling technology, this informative book describes current recycling products and techniques. The authors highlight a house made of trash, fashion accessories made from recycled rubber, a playground made of plastic, and carpets made from soda bottles.

Teacher Resources

Beautiful Junk: Creative Classroom Uses for Recyclable Materials. (1990). Written by Karen Brackett and Rosie Manley. Published by Fearon Teacher Aids. Distributed by Frank Schaefer. Paperback. ISBN: 0-8224-0626-8. 80 pages. (Grades 1-6). This resource contains more than 200 creative ideas for recycling boxes, cans, flyers, and other throwaways into classroom equipment and materials for student projects.

Recycling Fun!

This entertaining collection of activity books invites youngsters to make imaginative clothes, games, gifts, toys, and decorations from reusable materials. Each title contains creative project ideas, easy instructions, helpful illustrations, fascinating facts, and useful conservation tips. Being "earth friendly" has never been so much fun!

Written by George Pfiffner. Published by John Wiley and Sons. Paperback. 128 pages. (Ages 8-12).

Earth-Friendly Holidays: How to Make Fabulous Gifts and Decorations from Reusable Objects. (1995). ISBN: 0-471-12005-7.

Earth-Friendly Outdoor Fun: How to Make Fabulous Games, Gardens, and Other Projects from Reusable Objects. (1996). ISBN: 0-471-14113-5.

Earth-Friendly Toys: How to Make Fabulous Toys and Games from Reusable Objects. (1994). ISBN: 0-471-00822-2.

Earth-Friendly Wearables: How to Make Fabulous Clothes and Accessories from Reusable Objects. (1995). ISBN: 0-471-00823-0.



SEM Activity Page

Feed The Birds • Feed The Birds • Feed The Birds



Attract all kinds of feathered friends to your backyard or school yard with these easy-to-make, inexpensive bird feeders. Have fun and add your own creative touch!

Pinecone Delight—Spread peanut butter on a pinecone and roll it in birdseed. Affix a string to the cone and hang it from a tree, wall, or fence. **Idea Sparker:** If you do not have pinecones, you can also do this activity with empty toilet paper tubes. Simply punch two holes in the top of a tube, thread a piece of string through, and tie the two ends together. Spread peanut butter on the tube, roll it in birdseed and hang it in your favorite tree. (All ages).

Clothesline Dining—Find a clothesline and string up pieces of bread, plain bagels, plain donuts, dried apples, baked potatoes (with their skins), or unsalted pretzels. (All ages).

Edible Garland—Use a needle and sturdy thread/string to make an edible garland for birds. String up a variety of foods including: popcorn, berries (cranberries, blueberries), peanuts in the shell, fruit wedges (apples, oranges), cheese, bread pieces or plain croutons, and plain dry cereal (Cheerios). Tie knots at both ends of the string and hang the finished garland on a nearby tree. (Ages 8 and up).

Fruit Treats—Cut an orange, apple or coconut in half, use a needle to attach a piece of yarn, and hang the fruit in a tree. For the coconut, you might need to drill a hole in the shell before attaching the yarn. (Ages 8 and up).

Suet Bell—In a pan, mix one portion of lard or vegetable shortening with two portions of birdseed mixture. Heat the ingredients over medium heat, stirring occasionally with a wooden spoon. Remove the pan from the stovetop when the ingredients are thoroughly mixed. Punch a hole in the bottom of a yogurt container and insert a 12" string, leaving 6" of string on each side of the container. While holding the string so it doesn't coil, spoon the cooled mixture into the yogurt cup and place it in the refrigerator or freezer to harden. When the mixture has solidified, slide the yogurt container off and hang the fresh suet bell in a tree. **Idea Sparker:** Fill an empty onion bag with suet mixture and hang it from a tree. (Ages 8 and up).

Log Feeder—Find a sturdy fallen branch or small log and cut it to a short length (10"-12" long). Use a hand drill to make 1/2" or 1" holes randomly around the branch/log. Fill the holes with bird pudding: Mix 1/2 cup of peanut butter, 1/2 cup of shortening, 1/2 cup of flour, and 2 cups of cornmeal. When the log feeder is ready, use eye screws and sturdy rope to hang it from a tree. (Ages 10 and up).

Coffee Can Feeder—Use an electric or manual can opener to cut off both ends of a coffee can, thread a piece of string through the inside of the can and tie both ends of the string together. Cut a plastic coffee can cover in half and place each half on the bottom section of both ends. Fill the coffee can with various bird treats including: apple pieces, corn, sunflower seeds, millet, berries, peanuts, cranberries, bread pieces, stale cheese, cooked rice, walnuts, almonds, dry cereal, pumpkin seeds, raisins, and frozen peas and corn. Hang the finished birdfeeder in an easy-to-see location (e.g., tree, window). (Ages 8 and up).

Milk Jug Feeder—Use scissors to cut holes (5" x 3") on three sides of a milk jug (leave the handle side intact). Use a nail or screwdriver to poke two holes in the top of the jug. Thread string or wire through the holes and make a loop by tying both ends of the string together. Fill the feeder with bird treats (see above) and hang it outside. (Ages 9 and up).

Suggestion: Adult supervision should be used when children are handling needles, hand drills, can openers, or sharp scissors.



Birds On The Web

Backyard Birding

www.bcpl.lib.md.us/~tross/by/backyard.html

Bird On!

birdcare.com/birdon

Birding on the Web, The Next Generation

www-stat.wharton.upenn.edu/~siler/birding.html

Birder

www.birder.com

★ Peterson On-Line

www.petersononline.com

The Virtual Birder

www.virtualbirder.com/vbirder



Calling All Bird Watchers!



Once you attract all kinds of birds to your backyard with delicious bird treats, take out your binoculars and field guides and try to identify and record their physical characteristics, behaviors, and eating habits. The following resources will come in handy.

Excellent Field Guides

National Audubon Society Field Guide to North American Birds: Eastern Region. Published by Alfred A. Knopf. ISBN: 0-679-42852-6. (Ages 12 and up).

National Audubon Society Field Guide to North American Birds: Western Region. Published by Alfred A. Knopf. ISBN: 0-679-42851-8. (Ages 12 and up).

National Audubon Society Pocket Guide: Eastern Birds. Published by Alfred A. Knopf. ISBN: 0-394-74839-5. (Ages 8 and up).

National Audubon Society Pocket Guide: Songbirds and Familiar Backyard Birds (East). Published by Alfred A. Knopf. ISBN: 0-679-74926-8. (Ages 8 and up).

National Audubon Society Pocket Guide: Songbirds and Familiar Backyard Birds (West). Published by Alfred A. Knopf. ISBN: 0-679-74925-X. (Ages 8 and up).

National Audubon Society Pocket Guide: Western Birds. Published by Alfred A. Knopf. ISBN: 0-394-74842-5. (Ages 8 and up).

Peterson Flash Guides: Backyard Birds. Published by Houghton Mifflin. ISBN: 0-395-79290-8. (Ages 10 and up).

Stokes Beginner's Guide to Birds: Eastern Region. Published by Little Brown. ISBN: 0-316-81811-9. (Ages 8 and up).

Stokes Beginner's Guide to Birds: Western Region. Published by Little Brown. ISBN: 0-316-81812-7. (Ages 8 and up).

★ **Stokes Field Guide to Birds: Eastern Region.** Published by Little Brown. ISBN: 0-316-81809-7. (Ages 10 and up).

★ **Stokes Field Guide to Birds: Western Region.** Published by Little Brown. ISBN: 0-316-81810-0. (Ages 10 and up).

Check Out This Excellent Magazine!

★ **Cobblestone.** Published by Cobblestone Publishing Company. 48 pages. (Ages 9-14). The following back issues focus on ecology: **John Audubon** (0382402936), **Endangered Species** (0382403622), and **Environmentalism** (038240405X).

More Great Birding Resources

Backyard Birds of Summer. (1996). Written by Carol Lerner. Published by William Morrow. Hardcover. ISBN: 0-688-13600-1. 48 pages. (All Ages).

Backyard Birds of Winter. (1994). Written by Carol Lerner. Published by William Morrow. Hardcover. ISBN: 0-688-12819-X. 48 pages. (All Ages).

DK Pockets: Birds. (1995). Written by Barbara Taylor. Published by Dorling Kindersley. Paperback. ISBN: 1-56458-661-8. 128 pages. (Ages 8 and up).

National Audubon Society Concise Birdfeeder Handbook: The Complete Guide to Attracting and Observing Birds. (1997). Written by Robert Burton. Published by Dorling Kindersley.



Native American Environmental Resources

For hundreds of years Native Americans have shown deep respect for the earth's natural resources. This collection of inspirational stories and activity books shows learners of all ages how to treat the earth with kindness and find compassionate ways to protect the earth's complex web of life.

Inspirational Story Collections

Native American Animal Stories. (1992). Written by Joseph Bruchac. Illustrated by John Kahionhes Fadden. Published by Fulcrum Publishing. Paperback. ISBN: 1-55591-127-7. 160 pages.

Native American Stories. (1991). Written by Joseph Bruchac. Illustrated by John Kahionhes Fadden. Published by Fulcrum Publishing. Paperback. ISBN: 1-55591-094-7. 160 pages.

Native Plant Stories. (1995). Written by Joseph Bruchac. Illustrated by John Kahionhes Fadden and David Kanietakeron Fadden. Published by Fulcrum Publishing. Paperback. ISBN: 1-55591-212-5. 160 pages.

The Way of the Earth: Native America and the Environment. (1995). Written by John Bierhorst. Published by William Morrow. Paperback. ISBN: 0-688-14349-0. 352 pages.



SEM Activity Page

How to Make a Compost Heap



Families and schools can reduce the amount of garbage they produce by making a simple compost heap. These natural recycling bins use soil, tiny microorganisms, water, and yard materials to change everyday kitchen scraps into nutrient-rich soil. Simply follow the suggestions below and you'll have a humus-filled compost pile in a few months.

Location. Give careful attention to the location of your compost heap. Choose a fairly level spot with reasonably good drainage. Your location should also be close to a water source (garden hose) and receive a good amount of sun.

Type of Enclosure. It is not necessary to have an enclosure around your compost heap, but an enclosure makes the pile much easier to build and maintain. You can build a simple or elaborate enclosure with a variety of materials including bricks, concrete blocks, wire, fencing, or wood (cedar, cypress, redwood). Whatever materials you decide to use, make sure the enclosure allows air to penetrate your pile (this will nourish bacteria and increase decomposition). The most common size for a compost bin is 4' x 4' x 4'. Keep your pile at least 3' high and no higher than 5'. Shallow piles tend to dry out easily and tall piles are difficult to turn over.

Layering. Start with a bottom layer of twigs or wood chips and add alternating green and brown layers. Composting works best with equal amounts of brown matter (dry leaves, wood materials, sawdust, pine needles) and green matter (food scraps, manure, grass clippings, and other yard trimmings). Add a few shovelfuls of garden soil on top of each layer. Adding layers of soil throughout the pile helps to bring in microbes, absorb odors, and hold the compost pile in place. Make each layer about four-six inches thick.

Compost Ingredients. In general, all organic matter is compostable. However, some materials such as meats, oil and dairy products attract rodents and undesirable animals. To keep your compost pile healthy and free of pesky critters, select items from the first list and avoid items from the second list.

Things to include: garden soil, leaves, grass clippings, weeds, garden refuse, cornstalks, old mulches, vegetable and fruit scraps, kitchen scraps (e.g., egg shells, bread, grains, coffee grounds, tea leaves), sawdust, manure, hair, seaweed, paper scraps, shredded newspaper, pine needles, peat moss.

Things to avoid: large sticks and branches, bones, animal fat, diseased vegetable plants or roots, black walnut husks, meat, fish, coal, grease, dairy products, dog and cat manure, foil, glass, metal, plastic.

Hint: Before tossing various items into your compost pile, make sure they are cut down into small pieces. (This will help the composting process).

Make A Compost Holder. Find a plastic milk jug and use scissors to cut away the top and side section of the jug (leave the handle side intact). Use permanent markers to decorate the outside of the jug. Keep the compost holder by the kitchen sink or garbage can and fill it daily with food scraps. Once a day, empty the container's contents into your compost bin and prepare it for the next day by washing it with hot, soapy water.

Managing the Pile. During decomposition, temperatures inside the heap can rise to 150-170 degrees Fahrenheit. The high temperatures aid decomposition, but they also are beneficial because weeds, insects and most disease organisms cannot survive under these conditions.

Keep the pile moist. Water the pile occasionally so it stays moist like a sponge. Water the pile layer by layer as you build it and whenever the pile begins to dry out. (If water runs out the bottom of the pile, you are watering it too much). Rainwater is the best water for the compost pile, because it picks up oxygen, minerals and nitrogen as it falls through the air. To help the pile catch rainwater, shape the top layer so the outside edges are higher than the middle. If it rains too much, cover the pile with a piece of plastic.

Aerate the pile. Once every few weeks, use a big stick to poke holes in the pile for better air circulation.

Turn the pile. After two weeks, use a spade or pitchfork to turn the materials in your pile—mix wet materials with dry ones and fresh materials with rotted ones. The temperature of your pile will help you decide when to turn it in the future. As the organic material in the pile decomposes, the temperature should heat up. Ideally, the pile should reach 140-160 degrees Fahrenheit. Whenever the temperature drops below 100-120 degrees Fahrenheit, the pile should be turned. If you do not have a thermometer to measure the temperature inside your pile, turn the pile once a week.

The Finished Product. After three or four months, your compost pile will turn dark and crumbly and smell like earth. This new nutrient-rich material is called humus. You can use this organic material to perk up potted plants, fertilize your vegetable garden, or sprinkle on flower beds. Humus makes a great soil blender, top dressing, or mulch. *Gift Idea:* Share some of your humus with friends who like to garden. Bag it up and give it away!

Compost Resources

Student Resources

Compost! Growing Gardens from Your Garbage. (1996). Written by Linda Glaser. Illustrated by Anca Hariton. Published by Millbrook Press. Paperback. ISBN: 0-7613-0030-9. 32 pages. (Ages 5-8).

Compost Critters. (1993). Written and illustrated by Bianca Lavies. Published by Dutton. Hardcover. ISBN: 0-525-44763-6. 32 pages. (Ages 7-11).

Teacher and Parent Resources

Compost This Book! The Art of Composting for Your Yard, Your Community, and the Planet. (1994). Written by Tom Christopher and Marty Asher. Published by Sierra Club Books. Distributed by Random House. Paperback. ISBN: 0-87156-596-X. 258 pages.

Let It Rot! A Gardener's Guide to Composting. (1990). Written by Stu Campbell. Published by Storey Communications, Inc. Paperback. ISBN: 0-88266-635-5. 160 pages.

Web Sites

The Compost Resource Page
www.oldgrowth.org/compost

Cornell Composting
www.cfe.cornell.edu/compost

Gardenline: Yard: Garden
www.ag.usak.ca/cofa/departments/hort/hortinfo/yards

Humosphere Website
www.composter.com

More Great Birding Resources Continued

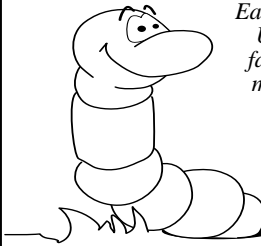
Paperback. ISBN: 0-7894-1465-1. 128 pages. (Ages 8 and up).

Activity Books and Kits

Expedition Series: Birds. Published by Scientific Explorer. Order Number 128. (Ages 9 and up). This bird kit includes a genuine Audubon Bird Call, a bird feeding station, a science booklet with experiments to explore bird intelligence and social behaviors, and bird seeds.



The Mighty Earthworm



Earthworms benefit the earth in so many ways! Use the following list of resources to plan a fascinating curriculum unit that explores the mighty earthworm—one of the world's most effective decomposers!

Student Resources

Earthworms: Underground Farmers. (1997). Written by Patricia Lauber. Illustrated by Todd Telander. Published by Henry Holt. Paperback. ISBN: 0-8050-4897-9. 64 pages. (Ages 8-12).

Nature Close-Up: Earthworms. (1996). Written by Elaine Pascoe. Published by Blackbirch Press. Hardcover. ISBN: 1-56711-177-7. 48 pages. (Ages 8-14).

Wonderful Worms. (1994). Written by Linda Glaser. Illustrated by Loretta Krupinski. Published by Millbrook Press. Paperback. ISBN: 1-56294-730-3. 32 pages. (Ages 5-8).

Wormology. (1996). Written by Michael Elsohn Ross. Photographs by Brian Grogan. Illustrated by Darren Erickson. Published by Carolrhoda Books. Hardcover. ISBN: 0-87614-937-9. 48 pages. (Ages 6-9).

Teacher and Parent Resources

Earthworms. (1989). Written by Robert C. Knott. Published by Lawrence Hall of Science. Paperback. ISBN: 0-912511-19-2. 60 pages.

The Wonderful World of Wigglers: Exploring the Mysteries of the Mighty Earthworm through Stories and Activities for the Curious Child. (1995). Written by Julie Hand. Published by Foodworks. Paperback. ISBN: 1-884430-00-7. 175 pages.

★ **Worm-A-Way Vermicomposting Kit.** Available from Flowerfield Enterprises. This kit contains one vermicomposter bin with snap on lid, a copy of **Worms Eat My Garbage**, ventilation tubes and vents, instructions and set-up guide, and a coupon for one pound of red worms.

★ **Worms Eat My Garbage: How to Set Up and Maintain a Worm Composting System.** (1997). Written by Mary Appelhof. Illustrated by Mary Frances Fenton. Published by Flowerfield Enterprises. Paperback. ISBN: 0-942256-10-7. 162 pages.

★ **Worms Eat Our Garbage: Classroom Activities for Better Environment.** (1993). Written by Mary Appelhof, Mary Frances Fenton, and Barbara Loss Harris. Published by Flowerfield Enterprises. Paperback. ISBN: 0-942256-05-0. 232 pages.



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Ecology Organizations & Associations



The Acid Rain Foundation
1410 Varsity Drive
Raleigh, NC 27606
Tel: 919-828-9443
Fax: 919-515-3593

The Adopt-A-Stream Foundation
600 - 128th Street SE
Everett, WA 98208
Tel: 425-316-8592
Fax: 425-338-1423
E-mail: aasf@streamkeeper.org
Web: www.streamkeeper.org

American Association of Museums
1575 Eye Street NW, Suite 400
Washington, DC 20005
Tel: 202-289-1818
Web: www.aam-us.org

America the Beautiful Fund
219 Shoreham Building
Washington, DC 20005
Tel: 202-638-1649
Web: www.America-the-beautiful.org

American Bird Conservancy
P.O. Box 249
The Plains, VA 20198
Tel: 888-BIRD-MAG
E-mail: abc@abcbirds.org
Web: abcbirds.org

American Birding Association
P.O. Box 6599
Colorado Springs, CO 80934
Tel: 719-578-9703
Fax: 719-578-1480
Web: www.americanbirding.org

American Cetacean Society
P.O. Box 1391
San Pedro, CA 90733-1391
Tel: 310-548-6279
Fax: 310-548-6950
E-mail: acs@pobox.com
Web: www.acsonline.org

American Conservation Association
1350 New York Avenue NW, Suite 300
Washington, DC 20005
Tel: 202-624-9365
E-mail: 74111.3156@compuserve.com

American Forest Foundation
1111 - 19th Street NW, Suite 780
Washington, DC 20036
Tel: 888-889-4466
E-mail: info@affoundation.org
Web: www.affoundation.org

The American Humane Association
63 Inverness Drive, East
Englewood, CO 80112
Tel: 303-792-5333
E-mail: info@americanhumane.org
Web: www.americanhumane.org

American Museum of Natural History
Central Park West 79th Street
New York, NY 10024
Tel: 212-769-5000
Web: www.amnh.org

American Nature Study Society
5881 Cold Brook Road
Homer, NY 13077
Tel: 607-749-3655

American Oceans Campaign
600 Pennsylvania Avenue SE, Suite 210
Washington, DC 20003
Tel: 202-544-3526
Fax: 202-544-5625
E-mail: info@americanoceans.org
Web: www.americanocceans.org

American Rivers
1025 Vermont Avenue NW, Suite 720
Washington, DC 20005
Tel: 202-347-7550
Fax: 202-347-9240
E-mail: amrivers@amrivers.org
Web: www.Americanrivers.org

American Zoo and Aquarium Association
8403 Colesville Road, Suite 710
Silver Spring, MD 20910
Tel: 301-562-0777
Web: www.aza.org

Americans for the Environment
1901 Pennsylvania Avenue NW, Suite 1100
Washington, DC 20006
Tel: (202) 797-6665
Web: www.AforE.org

Animal Welfare Institute
P.O. Box 3650
Washington, DC 20007
Tel: 202-337-2332
Fax: 202-338-9478
Web: www.awionline.org

Bat Conservation International
P.O. Box 162603
Austin, TX 77005
Tel: 512-327-9721
Web: www.batcon.org

Bureau of Land Management
1849 C Street NW, Room 406-L5
Washington, DC 20240
Tel: 202-452-5125
Web: www.blm.gov

Center for Environmental Information, Inc.
55 St. Paul Street
Rochester, NY 14604
E-mail: ceiroch@aol.com
Web: www.rochesterenvironment.org

Center for Marine Conservation
1725 DeSales Street NW, Suite 600
Washington, DC 20036
Tel: 202-429-5609
Fax: 202-872-0619
E-mail: CMC@dccmc.org
Web: www.cmc-ocean.org

Center for Plant Conservation
P.O. Box 299
St. Louis, MO 63166
Tel: 314-577-9450
Web: www.mobot.org/CPC

Cetacean Society International
P.O. Box 953
Georgetown, CT 06829
Tel: 203-431-1606
Web: csiwhalesalive.org

Chesapeake Bay Foundation
162 Prince George Street
Annapolis, MD 21401
Tel: 410-268-8816
Web: www.savethebay.cbf.org

Clean Ocean Action
P.O. Box 505
Highlands, NJ 07732-0505
Tel: 732-872-0111
Fax: 732-872-8041
E-mail: sandyhook@cleanoceanaction.org
Web: www.cleanoceanaction.org

Clean Water Fund
4455 Connecticut Ave. NW, Suite A300-16
Washington, DC 20008-2328
Tel: (202) 895-0432
Fax: (202) 895-0438
E-mail: cwf@cleanwater.org
Web: www.cleanwaterfund.org

Conservation International
1919 M Street NW, Suite 600
Washington, DC 20036
Tel: 202-912-1000
Web: www.conservation.org

Council for Environmental Education
5555 Morningside, Suite 212
Houston, TX 77005
E-mail: info@c-e-e.org
Web: www.c-e-e.org

The Cousteau Society
870 Greenbrier Circle, Suite 402
Chesapeake, VA 23320
Tel: 800-441-4395
E-mail: cousteau@cousteausociety.org

Defenders of Wildlife
1101 14th Street NW, Suite 1400
Washington, DC 20005
Tel: 202-682-9400
E-mail: info@defenders.org

Ducks Unlimited
1 Waterfowl Way
Memphis, TN 38120
Tel: 800-453-8257
Web: www.ducks.org

Earth Force
1908 Mt. Vernon Avenue
Alexandria, VA 22301
Tel: 703-299-9400
Web: www.earthforce.org

Earth Foundation
5401 Mitchelldale, Suite B-4
Houston, TX 77092
Tel: 800-5-MONKEY
Web: www.earthfound.com

Earth Island Institute
300 Broadway, Suite 28
San Francisco, CA 94133
Tel: 415-788-3666
Web: www.earthisland.org

Earthwatch
3 Clock Tower Place, Suite 100, Box 75
Maynard, MA 01754
Tel: 978-461-0081
Fax: 978-461-2332
E-mail: info@earthwatch.org
Web: www.earthwatch.org

Endangered Species Coalition
1101 -14th Street NW, Suite 1001
Washington, DC 20005
Tel: 202-682-9400
Fax: 202-756-2804

Environmental Action Foundation
333 John Carlyle Street, Suite 200
Alexandria, VA 22314
Tel: 703-548-3118
Fax: 703-548-3119
E-mail: sweattl@agc.org
Web: www.agc.org

Environmental Career Center
100 Bridge Street, Building C
Hampton, VA 23669
Tel: 757-727-7895
Fax: 757-727-7904
E-mail: eccinfo@environmentalcareer.com
Web: www.environmentalcareer.com

The Environmental Careers Organization, Inc.
179 South Street
Boston, MA 02111
Tel: 617-426-4375
Web: www.eco.org

Environmental Defense Fund
257 Park Avenue South
New York, NY 10010
Tel: 212-505-2100
Fax: 212-505-2375
E-mail: contact@environmentaldefense.org
Web: www.edf.org



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Environmental Protection Agency
Ariel Rios Building
1200 Pennsylvania Avenue NW
Washington, DC 20460
Tel: (202) 260-2090
Web: www.epa.gov

Environmental Resource Center
P.O. Box 819
Ketchum, ID 83340
Tel: 208-726-4333
Web: www.basemountain.com/erc_kids.htm

ERIC Clearinghouse for Science,
Mathematics & Environmental Education
1929 Kenny Road
Columbus, OH 43210
Tel: 800-276-0462
Fax: 614-292-0263
E-mail: ericsc@osu.edu
Web: www.ericse.org

The Field Museum
Roosevelt Road at Lake Shore Drive
Chicago, IL 60605
Tel: 312-922-9410
Web: www.fnmh.org

Friends of Animals, Inc.
777 Post Road
Darien, CT 06820
Tel: 203-656-1522
Fax: 203-656-0267
E-mail: info@friendsofanimals.org
Web: www.friendsofanimals.org

Friends of the Earth
26-28 Underwood Street
London N1 7JQ
UK
Tel: +44 (0)20-7490-1555
Fax: +44 (0)20-7490-0881
Web: www.foe.co.uk

The Fund for Animals, Inc.
200 West 57th Street
New York, NY 10019
Tel: 212-246-2096
Fax: 212-246-2633
E-mail: hdquarters@fund.org
Web: www.fund.org

GREEN (Global Rivers Environmental
Education Network)
1908 Mount Vernon Avenue, 2nd Floor
Alexandria, VA 22301
Tel: 703-299-9400
Fax: 703-299-9485
E-mail: green@earthforce.org
Web: www.green.org

Greenpeace USA
702 H Street NW
Washington, DC 20001
Tel: 800-326-0959
Web: www.greenpeaceusa.org

Humane Society of US
2100 L Street NW
Washington, DC 20037
Tel: 202-452-1100
Web: www.hsus.org

The Institute for Earth Education
Cedar Cove
Greenville, WV 24945
Tel: 304-832-6404
Fax: 304-832-6077
E-mail: iee1@aol.com
Web: www.eartheducation.org

International Crane Foundation
P.O. Box 447
Baraboo, WI 53913
Tel: 608-356-9462
Web: www.Baraboo.com/bus/icf/
whowhat.htm

International Fund for Animal Welfare
P.O. Box 193
Yarmouth Port, MA 02675
Tel: 508-744-2000
Fax: 508-744-2009
Web: www.ifaw.org

International Institute for Energy Conservation
750 1st Street NE, Suite 190
Washington, DC 20002
Tel: 202-842-3388
Fax: 202-842-1565
E-mail: iiec@igc.apc.org

International Wildlife Coalition
The Whale Adoption Project
70 E. Falmouth Highway
Falmouth, MA 02536
Tel: 508-548-8328
Fax: 508-548-8542
E-mail: extex@iwc.org
Web: www.iwc.org

International Wolf Center
1396 Highway 169
Ely, MN 55731
Tel: 800-ELY-WOLF
Web: www.wolf.org

Izaak Walton League of America
707 Conservation Lane
Gaithersburg, MD 20878
Tel: 800-453-5463
Web: www.iwla.org

Keep America Beautiful
1010 Washington Boulevard
Stamford, CT 06901
Tel: 203-323-8987
Fax: 203-325-9199
E-mail: ssmith@kab.org
Web: www.kab.org

Marine Environmental Research
Main Street on Mill Stream
P.O. Box 1652
Blue Hill, ME 04616
Tel: 207-374-2135
Fax: 207-359-8079
E-mail: Meri@downcast.net
Web: www.meriresearch.org

Monetary Bay Aquarium
886 Cannery Row
Monetary, CA 93940
Tel: 831-648-48888
Web: www.mbayaq.org

Mote Marine Laboratory
1600 Ken Thompson Parkway
Sarasota, FL 32436
Tel: 941-388-4441
Fax: 941-388-4007
E-mail: director@marinelab.Sarasota.fl.us
Web: www.marinelab.Sarasota.fl.us

National Arbor Day Foundation
100 Arbor Avenue
Nebraska City, NE 68410
Tel: 402-474-5655
E-mail: intro@arborday.org
Web: www.arborday.org

National Association of Biology Teachers
12030 Sunrise Valley Drive, Suite 110
Reston, VA 20191
Tel: 703-264-9696
Web: www.nabt.org

National Association for Interpretation (NAI)
P.O. Box 2246
Fort Collins, CO 80522
Tel: 888-900-8283
Web: www.interpnet.com

National Audubon Society
700 Broadway
New York, NY 10003
Tel: 212-979-3000
Fax: 212-979-3188
E-mail: education@Audubon.org
Web: www.Audubon.org

National Bird-Feeding Society
P.O. Box 23
Northbrook, IL 60065
Tel: 847-272-0135
Fax: 773-404-0923
Web: www.birdfeeding.org

National Coalition for Marine
Conservation
3 North King Street
Leesburg, VA 20176
Tel: 703-777-0037
Fax: 703-777-1107
E-mail: Christine@savethefish.org
Web: www.savethefish.org

National Council for Geographic Education
16A Leonard Hall
Indiana University of Pennsylvania
Indiana, PA 15705
Tel: 724-357-6290
Web: www.ncge.org

National Environmental Trust
1200 - 18th Street NW, Suite 500
Washington, DC 20036
Tel: 202-887-8800
Web: www.envirotrust.com

National Geographic Society
1145 - 17th Street NW
Washington, DC 20036
Tel: 202-857-7000
Web: www.nationalgeographic.com

National Oceanic and Atmospheric
Administration
14th Street and Constitution Avenue NW
Room 6013
Washington, DC 20230
Tel: 202-482-6090
Fax: 202-482-3154
E-mail: answers@noaa.gov
Web: www.noaa.gov

National Park Service
Interior Building
P.O. Box 37127
Washington, DC 20013
Tel: 202-208-4747
Web: www.nps.gov

National Parks and Conservation
Association
1776 Massachusetts Avenue NW, Suite 200
Washington, DC 20036
Tel: 800-NAT-PARK
Web: www.npca.org

National Science Teachers Association
1840 Wilson Boulevard
Arlington, VA 22201
Tel: 703-243-7100
Web: www.nsta.org

National Tree Trust
1120 G Street NW, Suite 770
Washington, DC 20005
Tel: 202-628-8733
Fax: 202-628-8735
E-mail: info@nationaltreetrust.org
Web: www.nationaltreetrust.org

National Wildlife Federation
11100 Wildlife Center Drive
Reston, VA 20190-5362
Tel: 800-822-9919
Web: www.nwf.org



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The Natural Resources Defense Council
40 West 20th Street
New York, NY 10011
Tel: 212-727-2700
Fax: 212-727-1773
E-mail: nrdcinfo@nrdc.org
Web: www.nrdc.org

The Nature Conservancy
4245 North Fairfax Drive, Suite 100
Arlington, VA 22203-1606
Tel: 800-628-6860
E-mail: comment@tnc.org
Web: www.nature.org

North American Association for
Environmental Education
1825 Connecticut Avenue NW, Suite 800
Washington, DC 20009
Tel: 202-884-8912
E-mail: email@naaee.org
Web: www.naaee.org

Ozone Action
Clean Air Coalition of Southeast Michigan
535 Griswold Street, Suite 300
Detroit, MI 48226
Tel: 313-961-4266
Fax: 313-961-4869
E-mail: ozoneaction@semcog.org
Web: www.semcog.org

Project Learning Tree
1111 - 19th Street NW, Suite 780
Washington, DC 20036
Tel: 202-463-2462
Web: www.plt.org

Project WET
201 Culbertson Hall
Montana State University
Bozeman, MT 59717
Tel: 406-994-5392
Web: www.Montana.edu/wwwwet

Project WILD
707 Conservation Lane, Suite 305
Gaithersburg, MD 20878
Tel: 301-527-8900
Web: www.projectwild.org

Rachel Carson Council, Inc.
8940 Jones Mill Road
Chevy Chase, MD 20815
Tel: 301-652-1877
E-mail: rccouncil@aol.com

Rainforest Action Network
221 Pine Street, Suite 500
San Francisco, CA 94104
Tel: 415-398-4404
Fax: 415-398-2732
Web: www.ran.org
E-mail: rainforest@ran.org

Rainforest Alliance
65 Bleecker Street
New York, NY 10012
Tel: 888-my-earth
Fax: 212-677-2187
Web: www.rainforest-alliance.org

Renew America
1200 - 18th Street NW, Suite 1100
Washington, DC 20036
Tel: 202-721-1545
Fax: 202-467-5780
E-mail: renew@renewtheearth.org
Web: www.renewtheearth.org

Renewable Natural Resources Foundation
5430 Grosvenor Lane
Bethesda, MD 20814-2193
Tel: 301-493-9101
Fax: 301-493-6148
E-mail: info@rnrf.org
Web: www.rnrf.org

River Network
520 - 6th Avenue SW
Portland, OR 97204
Tel: 503-241-3506
Web: www.rivernetwork.org

Rocky Mountain Institute
1739 Snowmass Creek Road
Snowmass, CO 81654
Tel: 970-927-3851
Web: www.rmi.org

Save America's Forests
4 Library Court SE
Washington, DC 20003
Tel: 202-544-9219
Web: www.saveamericasforests.org

Save the Manatee Club
500 North Maitland Avenue
Maitland, FL 32751
Tel: 407-539-0990
E-mail: education@savethemanatee.org
Web: www.savethemanatee.org

Sierra Club
85 Second Street, 2nd Floor
San Francisco, CA 94105-3441
Tel: 415-977-5500
Fax: 415-977-5799
E-mail: information@sierraclub.org
Web: www.sierraclub.org

Smithsonian Institution
SI Building, Room 153
Washington, DC 20560-0010
Tel: 202-357-2700
Web: www.si.edu

Student Conservation Association, Inc.
689 River Road
P.O. Box 550
Charlestown, NH 03603
Tel: 603-543-1700
Fax: 603-543-1828
Web: www.sca-inc.org

TreePeople
12601 Mulholland Drive
Beverly Hills, CA 90210
Tel: 818-753-4600
Fax: 818-753-4635
E-mail: TreePeople@TreePeople.org
Web: www.treepeople.org

U.S. Department of Agriculture
14th Street and Independence Avenue SW
Washington, DC 20250
E-mail: vic.powell@usda.gov
Web: www.usda.gov

U.S. Department of Energy
1000 Independence Avenue SW
Washington, DC 20585
Phone: 1-800-dial-DOE
Fax: 202-586-4403
Web: www.energy.gov

U.S. Environmental Protection Agency (EPA)
401 M Street SW
Washington, DC 20460
Tel: 202-260-2090
Web: www.epa.gov

U.S. Fish and Wildlife Service
1849 C Street NW
Washington, DC 20240
Tel: 202-208-4131
Web: www.fws.gov

U.S. Forest Service
Auditors Building
201 - 14th Street at Independence Ave. SW
Washington, DC 20250
Tel: 202-205-1760
Web: www.fs.fed.us

Voice of the Environment
P.O. Box 355
Bolinas, CA 94924
Tel: 415-868-2986
Fax: 415-868-2898
E-mail: vote@pacific.net
Web: www.voteaction.org

Wilderness Education Association
900 East 7th Street
Bloomington IN, 47405
Tel: 812-855-4095
Fax: 812-855-8697
E-mail: wea@indiana.edu
Web: www.ebl.org/wea

The Wilderness Society
1615 M Street NW
Washington, DC 20036
Tel: 1-800-THE-WILD
E-mail: tws@wilderness.org
Web: www.wilderness.org

Wildlife Action, Inc.
P.O. Box 866
Mullins, SC 29574
Tel: 800-753-2264
Fax: 843-464-8859
E-mail: info@wildlifeaction.com
Web: www.wildlifeaction.com

Wildlife Conservation Society
2300 Southern Boulevard
Bronx, NY 10460-1099
Web: wcs.org

Wildlife Forever
10365 West 70th Street
Eden Prairie, MN 55344
Tel: 952-833-1522
E-mail: info@wildlifeforever.org
Web: www.wildlifeforever.org

Wildlife Information Center, Inc.
5410 Grosvenor Lane
Bethesda, MD 20814
Tel: 301-897-9770
Fax: 301-530-2471
E-mail: TWS@Wildlife.org
Web: www.wildlife.org

Wildlife Preservation Trust International, Inc.
1520 Locust Street, Suite 704
Philadelphia, PA 19102
Tel: 215-731-9770
Web: www.cc.columbia.edu/cu/cerc/wpti.html

Windows on the Wild (WOW)
1250 - 24th Street NW
Washington, DC 20037
Tel: 202-293-4800
Web: www.worldwildlife.org/windows

World Resources Institute
1709 New York Avenue NW
Washington, DC 20006
Tel: 202-638-6300
Web: www.wri.org

World Wildlife Fund
1250 - 24th Street NW
Washington, DC 20037
Tel: 800-call-wwf
Web: www.worldwildlife.org

Zero Population Growth, Inc.
1400 - 16th Street NW, Suite 320
Washington, DC 20036
Tel: 202-332-2200
Web: www.zpg.org



Environmental Idea Sparkers



These activities found on pages 6-9 are designed to encourage environmental conservation and respect for all living things. These ideas, which integrate science, language arts, social studies, and the visual and performing arts, can be used with students of all age levels.

- **Sponsor a bottle and can drive.** By recycling aluminum cans and plastic and glass bottles, not only are you helping the environment, but you are also earning extra money for classroom supplies and materials.
 - **Organize and participate** in a tree-planting project. Invite students and faculty to plant trees in and around the school yard, as well as in various places throughout the community. There are numerous benefits to planting trees: (1) they absorb carbon dioxide and help restore oxygen, (2) they help counteract the greenhouse effect, (3) they help prevent soil erosion, (4) they give us shade and help conserve energy, (5) they provide us with fruits and nuts, and (6) they give homes and food to animals.
 - **Ask students to create inventions that could help the environment.** First, ask students to brainstorm a "bug list" of environmental problems, such as: global warming, smog, soil erosion, toxic waste, acid rain, habitat destruction, and pollution. After the brainstorming session, ask students to select one environmental problem and brainstorm possible solutions to that problem. Invite students to select their favorite solution and create a prototype or working model for an invention that offers a solution to their environmental problem. During the invention process, ask students to write their thoughts and ideas in an inventor's journal. When the inventions are finished, have students share their finished products and ideas. Invite students to design a display.
 - **Ask students to select an endangered species and write a story about a day in the life of that animal.** Have students research the endangered animal's appearance, habitat, eating habits, behaviors, unusual characteristics, and reasons for its endangered status. After students have gathered facts and information about their animals, ask them to close their eyes and imagine what it would be like to become their selected animal for a day. While their eyes are closed, guide their thoughts by asking descriptive questions:
 - How would they feel?
 - Where would they live?
 - What would they eat or drink?
 - Where and when would they sleep?
 - Who would be their enemies?
 - What would they do for fun?
 - Would they be alone or would they have a family?
 - Where would they travel?
- When students are ready, have them write a story about a day in the life of their selected animal (from the animal's point of view). After the stories are finished, invite students to (a) illustrate their story in the form of a picture book, pop-up book or comic strip or (b) perform their story in the form of a puppet show, flannel board story, dance/musical, or play.
- **Ask students to create musical instruments out of reusable trash items.** Invite students to use recycled items as they create various musical instruments, such as a *drum* (oatmeal boxes, popsicle sticks, aluminum foil, and paper), *guitar* (empty cardboard boxes, shoe boxes, paper towel rolls, newspaper, and elastic bands), *tambourine* (aluminum pie plates, screws, washers, yam, and wire), and *kazoo* (comb and wax paper). Display a variety of reusable trash items on a table and let students create and invent new and unusual musical instruments with the materials.
 - **Invite students to bring in one non-perishable trash item, and ask them to brainstorm alternate ways to use/recycle that piece of garbage.** Have students discuss their ideas and share their lists. Repeat this activity for one week. After a week, ask students to discuss their reactions to this exercise, their feelings toward garbage and waste, and how their feelings will influence their future behaviors.
 - **Ask interested students to gather information about how they can help the environment.** For information about student organizations, have students write to: The Kids' Earth Works Group, 1400 Shattuck Ave., #25, Berkeley, CA 94709.



Eye on the Environment



Classroom Tips

How can classroom teachers and their students improve their classroom conservation efforts? Read the following tips and learn how you and your students can become better environmental conservers.

- ♥ Ask students to **use both sides of their papers**.
- ♥ **Start a scrap paper box** and invite students to place their discardable papers inside. Have students use the scrap paper for math computations, games, quizzes, and more.
- ♥ **Turn off the lights** every time you leave the classroom.
- ♥ **Use water-based markers** instead of permanent markers. Permanent markers have harmful solvents.
- ♥ Extend the durability and life of classroom instructional materials, posters and paperback books by **laminating or using clear contact paper** to protect these materials.
- ♥ Decrease the amount of packaging by **buying materials and supplies in bulk**. Also, buy recyclable and reusable materials that have minimal packaging.
- ♥ Encourage students to **use cloth handkerchiefs** instead of tissues.
- ♥ Create new art projects by **using reusable junk**. Make paper and other art supplies from natural and recycled materials.
- ♥ **Buy recycled paper products**, such as notebooks, newsprint, composition paper, and toilet paper.
- ♥ Encourage students to **recycle, reduce and reuse waste** at school and at home.

Discuss the following quote with Your students.

Earthwords

The friend of nature is the man who feels himself inwardly united with everything that lives in nature, who shares the fate of all creatures, helps them when he can in their pain and need, and as far as possible, avoids injuring or taking life. (**Albert Schweitzer**)

Make No-Trash Lunches

- Bring your lunch in a backpack, lunch box, or reusable canvas or nylon lunch bag.
- Put sandwiches, snacks, and all other food in reusable tupperware containers.
- Put milk, juice, water, or other drinks in a thermos, reusable glass bottle or plastic bottle.
- Use cloth napkins and regular silverware from home.
- Avoid individually wrapped foods, junk foods, disposable paper products (plates, cups and napkins), plastic ware (spoons, forks and knives), plastic or zip lock bags, and aluminum foil.

SPONSOR TRASHABLE TREASURES DAY!

Invite teachers, students, family members, and friends to donate trash. Some great reusable trash items might include: empty coffee cans, milk jugs, butter containers, cardboard boxes, baby food jars, frozen orange juice cans, shoe boxes, and oatmeal containers; discontinued wall paper books; rug and fabric scraps; egg cartons; tires; six pack rings; nylons; Styrofoam peanuts; popsicle sticks; soda can tabs; and much more. When all of the items have been collected, display the materials and invite interested people to select their favorite trashable treasures (free of charge). After all, one person's trash might be another person's treasure!



Start Your Own Recycling Program



Before you organize a recycling program with your students, you should teach them the three R's **Reduce, Reuse, and Recycle**.

- 1) Emphasize the importance of **reducing** the amount Of garbage Produced everyday. Have students keep track of their daily production of garbage and ask them to record the results in a journal. After a week, ask students to discuss the most common items on their lists. During the group discussion, ask students to brainstorm a list of ways that they can reduce the amount of garbage produced in the classroom and at home. Post a list of suggestions on a large poster board and ask students to practice garbage reduction in your classroom.
- 2) Emphasize the importance of **reusing** certain items, such as lunch bags, cardboard products, plastic utensils, and more. Have students take a walk around the school and make a list of all the items that can be reused. Ask them to share the results with the entire school and invite all staff members and students to practice reusing certain garbage items.
- 3) Emphasize the importance of **recycling**. Many common school items such as white paper, construction. paper, newspaper, cans, glass and plastic bottles can and should be recycled. Discuss the need to recycle other household items, such as tires, aluminum foil, jars, metal cans and more. invite interested students to set up a recycling center in your classroom . If you do not have a recycling program in your school, now is the time to get one started.

Getting Started:

- Form a committee of people who are interested in starting a recycling program in your school. This committee can be large or small, but it should be represented by members of the administration, teaching staff, student body, parent groups, and janitorial staff. Select one person as the committee chairperson and group representative. The role of this person is to act as a public speaker and recruiter. Assign each committee member specific responsibilities, such as setting up recycling bins, bringing recycled items to redemption center, collecting recycled items from each classroom, etc. After all of the duties have been assigned, roll up your sleeves and get to work! Not only will this learning experience be memorable, but it will also be helpful to the environment!
- Invite committee members to research local recycling programs in your area. Find out about the recycling practices of other schools, small businesses, municipal offices, and public organizations. Research the city-run recycling programs and private hauling companies to learn more about pick-up schedules and price estimates. Look in the phone book under "recycling" to find contacts and phone numbers. After this research, make arrangements for the pick-up or drop-off of recycled items.

Suggestions

- Start small (individual classrooms and cafeteria) and continue to grow as support strengthens.
- Invite members of local newspapers to visit your school and view your recycling program. If the success of your program is shared with citizens and other schools, perhaps other recycling programs will be started, too.

Decide What Needs to Be Recycled:

- Research the garbage in your school by completing an informal analysis of the trash. Empty out random garbage cans in your school and analyze the contents. Ask teachers to monitor what is thrown away in their classrooms. Ask janitorial staff members for observations.
- The main items recycled in schools are: white paper, other paper (construction), cans (aluminum), bottles, newspapers, and boxes.

Set Up Recycling Stations:

- Set up recycling bins for white paper, construction paper, and newspaper in each classroom. Have teachers mark each bin clearly and place them next to the garbage cans. Ask one student per classroom to serve as a monitor. (Rotate this responsibility on a weekly basis). This student is responsible for organizing the week's recycled items and transporting them to the school's recycling center.
- Set up recycling bins for paper in the offices.
- Set up recycling bins for paper, plastic, aluminum, and glass in the cafeteria. The committee members who are responsible for organizing and collecting the recycled materials in the cafeteria, should monitor this station on a daily basis and empty any overflowing bins.
- Designate a storage area in the school as the recycling center. This area should be readily accessible to student monitors and committee members in charge of collecting the recycled items. (Storage bins should be fireproof and made of metal or fire resistant plastic).



Make Your Own Recycled Paper



Making recycled paper is easy, fun, and helpful to the environment. Since paper is so important to us and we use so much of it everyday, we must be careful not to exhaust the supply of our precious natural resources—trees. So, roll up your sleeves and invite your students to do the same, and make your own recycled paper for classroom projects and activities.

Below is a basic recipe for making recycled paper. It's a simple procedure and it takes less than one hour (fifteen minutes of preparation time on the first day and 20-30 minutes on the second day).

Materials:

- ◆ Several sheets of paper—(newspaper, white paper, colored construction paper, paper bags, and more)
- ◆ Screen on a frame—(to make one, buy window screen material and staple it onto a wooden frame 8" x 8")
- ◆ Container for soaking water—(12" x 12" dishpan or bucket)
- ◆ Electric blender (or hand mixer)
- ◆ Water
- ◆ Newspaper or old bed sheet material
- ◆ Iron (optional)
- ◆ Towels (for clean-up)

Procedure:

- 1) Tear paper into pieces about 1" square. Soak in a dishpan or bucket filled with water for several hours or overnight.
- 2) The next day, place one-half cup of wet paper into the blender. Fill the blender with water from the dishpan or bucket. Blend for approximately 30 seconds.
- 3) Pour the pulp mixture into the dishpan or bucket. Using two hands, scoop the screen into the mixture and slide it back and forth. After the pulp collects on the screen, lift it straight up (so the pulp will be evenly distributed on the screen). Hold the screen over the dishpan and let the water drain out.
- 4) Place a layer of newspaper or old bed sheet material above and below the screen and gently press out the excess water. Turn the screen over (so the pulp is on the bottom) and set it on the table. Carefully lift the screen off the wet paper. Place another layer of newspaper over the wet paper and gently press out more water. Turn it over and remove the layer of newspaper. Repeat this step a few times.
- 5) Gently peel the damp, recycled paper off of the newspaper and place on a dry, flat surface (tabletop). Dry overnight or use a heated iron to press the recycled paper.

Variations:

- ◆ Experiment with different types and textures of paper.
- ◆ Add dry flowers, leaves, grass, potpourri, etc. to the paper when you pour it onto the screen to make ornamental paper.
- ◆ Add one tablespoon of starch to the wet paper to create a finish on the paper.
- ◆ Add one tablespoon of bleach to the wet pulp mixture. This will begin the de-inking process.
- ◆ Add food coloring or natural dyes to the wet pulp mixture for extra color.
- ◆ Add spices or perfume to the wet pulp mixture to create scented paper.

Spotlight on Type III's

Written by Joanne Elmer

Ecology Project Ideas • Ecology Project Ideas

Create A Picture Book

Create a picture book designed to teach younger students how to protect the environment. Example: Tien Ho, an eighth grade student in Toronto, wrote and illustrated a book entitled **Every Little Bit Helps**. Accompanied by rich watercolor paintings, this story describes how a grandfather teaches his young grandson how to protect the earth by conserving water, recycling artwork, and properly disposing of garbage.

Create An Interest Development Center

Create a learning center about an environmental issue in your town or city. The center can be used as an interest center in other classes or in the school library.

- (1) Use a tri-fold piece of cardboard or foamcore that can be set up on a table and then folded up for easy storage. Decorate the background with drawings, magazine pictures, and/or photographs, and make a catchy title with appealing graphics.
- (2) From the school library, obtain and set up a collection of introductory books, magazines, relevant newspaper articles, pamphlets, filmstrips, and videotapes on the topic. Include a list of these materials in your Teacher Resource List (see suggestion 5).
- (3) Using Bloom's Taxonomy, create a series of activities for each level (knowledge, comprehension, application, analysis, synthesis, and evaluation). Print the activities on cards and attach them to the board in an interesting way. Example: One seventh grade student, who was involved in a citizens' campaign to clean up the Don River in Toronto, developed a center with a series of fascinating activities written on fish shapes. The fish were color-coded according to the level of the activity and the fish cards were attached to the cardboard center with metal fish-hooks.
- (4) Include some general high interest activities on the topic, such as a word search or crossword puzzle.
- (5) On the back of the board, paste a Teacher Resource List of books, articles, videotapes, resource people, and teaching aids and indicate where these resources can be located.

Book Notes • Book Notes • Book Notes • Book Notes

An excellent resource book for the study of ecology is **Earthcycles and Ecosystems** written by Beth Savan. This book contains information and suggested experiments and activities suitable for elementary and middle school students. This resource discusses ecosystems, habitats, air pollution, water waste and pollution, and soil. The chapter entitled "Raise a Ruckus" explains how youngsters can persuade people to care about the environment by writing effective letters. Another chapter entitled "Roll Up Your Sleeves" provides suggestions for readers to take action and help the environment.



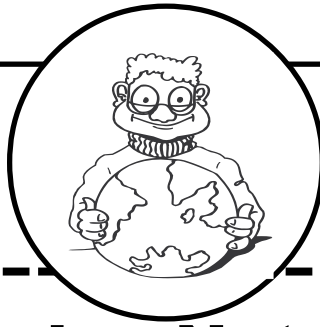
Joanne Elmer is a teacher in Toronto, Canada and a graduate of the Teaching for Talent Development program at the University of Connecticut. In her six years as a teacher in a pull-out gifted program for 7th and 8th grade students and a full-time 4th, 5th, and 6th grade gifted program, she has had extensive experience in facilitating the development of Type III Enrichment projects.

Reduce • Reuse • Recycle • Reduce • Reuse • Recycle

Start a Toy Repair Shop. Extend the life of toys by opening a toy repair shop that fixes broken trucks, torn teddy bears, games with missing pieces, etc.



Start a Lending Library. Invite students to donate old toys, games, books, and magazines to a classroom lending library. Set up a center where all students can enjoy and borrow the materials.



Families Enjoying Nature Together!

This collection of outstanding activity books invites families to venture into their backyards and find exciting ways to explore different aspects of the natural world—from bugs and slugs to leaves and trees.

Beastly Abodes: Homes for Birds, Bats, Butterflies & Other Backyard Wildlife. (1996). Written by Bobbe Needham. Published by Sterling Publishing Company, Inc. Paperback. ISBN: 0-8069-3169-8. 144 pages.

★ **City Kids and City Critters! Activities for Urban Explorers.** (1996). From the Houston Arboretum & Nature Center and written by Janet Wier Roberts and Carole Huelbig. Illustrated by Kim Salinas. Published by McGraw-Hill. Paperback. ISBN: 0-07-053201-X. 160 pages.

The Curiosity Club: Kids' Nature Activity Book. (1992). Written by Allene Roberts. Published by John Wiley and Sons. Paperback. ISBN: 0-471-55589-4. 192 pages.

★ **Earth Child 2000: Early Science for Children.** (1997). Written by Kathryn Sheehan and Mary Waidner, Ph.D. Published by Council Oak Books. Paperback. ISBN: 1-57178-054-8. 480 pages.

★ **EcoArt! Earth-Friendly Art & Craft Experiences for 3 to 9 Year-Olds.** (1993). Written by Laurie Carlson. Published by Williamson Publishing Company. Paperback. ISBN: 0-913589-68-3. 160 pages.

Good Earth Art: Environmental Art for Kids. (1991). Written by MaryAnn F. Kohl and Cindy Gainer. Published by Bright Ring Publishing. Distributed by Independent Publishers Group. Paperback. ISBN: 0-935607-01-3. 244 pages.

Hands-On Nature: Information and Activities for Exploring the Environment with Children. (1987). Edited by Jenepher Lingelbach. Published by University Press of New England. Distributed by Independent Publishers Group. Paperback. ISBN: 0-961762-70-5. 233 pages.

Janice VanCleave's Ecology for Every Kid: Easy Activities That Make Learning Science Fun. (1996). Written by Janice VanCleave. Published by John Wiley and Sons. Paperback. ISBN: 0-471-10086-2. 240 pages.

The Kids' Wildlife Book: Exploring Animal Worlds Through Indoor/Outdoor Experiences. (1994). Written by Warner Shedd. Published by Williamson Publishing Company. Paperback. ISBN: 0-913589-77-2. 160 pages.

★ **More Teaching Kids to Love the Earth: 156 Environmental Activities for Parents and Other Teachers.** (1994). Written by Marina Lachecki and James Kasperson. Published by Pfeiffer-Hamilton. Paperback. ISBN: 1-57025-040-5. 192 pages.

Nature for the Very Young: A Handbook of Indoor & Outdoor Activities. (1989). Written by Marcia Bowden. Published by John Wiley and Sons. Paperback. ISBN: 0-471-62084-X. 240 pages.

Nature in a Nutshell for Kids: Over 100 Activities You Can Do in Ten Minutes or Less. (1995). Written by Jean Potter. Published by John Wiley and Sons. Paperback. ISBN: 0-471-04444-X. 144 pages.

Nature Smart: A Family Guide to Nature. (1995). Written by Stan Tekiela and Karen Shanberg. Published by Adventure Publications. Paperback. ISBN: 1-885061-08-0. 300 pages.

Play Lightly on the Earth: Nature Activities for Children 3 to 9 Years Old. (1997). Written by Jacqueline Horsfall. Published by Dawn Publications. Paperback. ISBN: 1-883220-68-8. 176 pages.

Projects for a Healthy Planet: Simple Environmental Experiments for Kids. (1992). Written by Shar Levine and Allison Grafton. Illustrated by Terry Chui. Published by John Wiley and Sons. Paperback. ISBN: 0-471-55484-7. 96 pages.

Sharing the Joy of Nature: Nature Activities for All Ages. (1989). Written by Joseph Cornell. Published by Dawn Publications. Paperback. ISBN: 1-916124-52-5. 176 pages.

Slugs, Bugs and Salamanders: Discovering Animals in Your Garden. (1997). Written by Sally Kneidel. Illustrated by Anna-Maria Crum. Published by Fulcrum Publishing. Paperback. ISBN: 1-55591-313-X. 128 pages.

Talking to Fireflies, Shrinking the Moon: Activities for All Ages. (1997). Written by Edward Duensing. Published by Fulcrum Publishing. Paperback. ISBN: 1-55591-310-5. 144 pages.

★ **Teaching Kids to Love the Earth: Sharing a Sense of Wonder...186 Outdoor Activities for Parents and Other Teachers.** (1991). Written by Marina Herman, Joseph Passineau, Ann Schimpf, and Paul Treuer. Published by Pfeiffer-Hamilton. Paperback. ISBN: 0-938586-42-4. 192 pages.

Watching Wildlife: The National Wildlife Federation Guide to Observing Animals in the Wild. (1997). Written by Joe La Tourrette. Published by Henry Holt. Paperback. ISBN: 0-8050-4685-2. 160 pages.

Watching Wildlife: Tips, Gear and Great Places for Enjoying America's Wild Creatures. (1995). Written by Mark Damian Duda. Published by Falcon Press. Paperback. ISBN: 1-56044-315-4. 120 pages.



World Wildlife Fund

Educational Materials



Windows on the Wild[®], or *WOW*, is an award-winning environmental education program of World Wildlife Fund (WWF). The goal of *WOW* is to educate people of all ages about biodiversity issues and stimulate critical thinking, discussion, and responsible action on behalf of the environment.

Biodiversity Essentials

WOW!—A Biodiversity Primer. *World Wildlife Fund.* More than a dozen stories and articles fill the pages of this full-color, 68-page magazine-style primer for middle school students. The primer features an interview with renowned biologist E.O. Wilson, facts about everyday products and how they affect the environment, an interview with Mother Nature about natural disasters, and a collection of wildlife photos by Gerry Ellis. The primer is part of World Wildlife Fund's exemplary environmental education program, *Windows on the Wild*[®]. #EE-5561.

Biodiversity Basics—An Educator's Guide to Exploring the Web of Life. *World Wildlife Fund.* This comprehensive biodiversity module features an Educators Guide (482 pages), the Student Book (230 pages), a copy of *WOW!—A Biodiversity Primer*, and a full-color poster map of the Global 200 Ecoregions—the richest, rarest, and most threatened natural areas on the planet. Designed for middle school, *Biodiversity Basics* explores the meaning of biological diversity, its significance, current status, and measures taken to protect it. Extensive background information is complemented by 34 interdisciplinary activities for teachers and nonformal educators, each with an overview, objectives, listing of subjects and skills covered, vocabulary, framework correlations, and assessment strategies. Appendices offer guidelines for action projects, a biodiversity education framework, language learning tips, current legislation, planning charts, a glossary, and a bibliography. Student Book pages are matched to support the activities in the Educator's Guide. **COMPLETE SET** (Educator's Guide, Student Book, *WOW!—A Biodiversity Primer*, and the *Global 200* map). #EE-7032.

An Educator's Guide, Ideas for Using the Biodiversity Primer. *World Wildlife Fund.* This 28-page guide complements *WOW!—A Biodiversity Primer* by featuring activities and ideas for use in schools, nature centers, museums, and zoos. Discusses techniques for integrating biodiversity across disciplines, linking with math, language arts, social studies, and science. Provides guidance for those who would like to develop individual classroom or community activities designed to document biodiversity in a specific, local region. Includes a useful glossary and comprehensive listing of multimedia resources. #EE-5662.

New Curriculum Module

Wildlife for Sale—An Educator's Guide to Wildlife Trade. *World Wildlife Fund.* This interdisciplinary module is designed to educate middle-school students about the international trade in wildlife and wildlife products. Illegal, uncontrolled wildlife trade is one of the most significant threats to biodiversity today. At the same time, legal wildlife trade can be an important tool for conservation by providing a sustainable income source to local communities. Through fifteen interdisciplinary activities, *Wildlife for Sale* teaches students about the nature of wildlife trade, how wildlife trade can become a problem, and ways that wildlife trade is managed and regulated. The module, packaged in a 3-ring binder, includes background information for educators, a comprehensive list of resources, and unit plans to help educators incorporate the module into their curricula. Included free with purchase of the module is a slide show that highlights the issues in the activities. The storyline follows four characters who are consumers of wildlife products—both knowingly and unknowingly—and highlights ways individuals can become better informed community members. The slide show presents an overview of wildlife trade and its significance at the local and global levels. #EE-8701.

Environmental Issues Forums

The Biodiversity Debate: Exploring the Issue. *North American Association for Environmental Education* in collaboration with *World Wildlife Fund.* Although rain forests are often appropriately cited for their incredible biodiversity, it is likely that within a short distance from any metropolitan area, one can find natural environments that support a wide array of plants and animals. When land use patterns in these diverse areas are altered, community debates arise and polarization often sets in. This guide shows how to approach these controversies through the development of Environmental Issues Forums (EIFs) designed to bring citizens together in locally initiated, nonpartisan discussions about environmental issues that concern them. This superb 43-page guide provides civic and educational organizations, high schools and colleges, service organizations, religious groups, governmental agencies and others with a place to start, all with a common goal of finding solutions at the community level. #EE-6518. Also available, **THE ISSUE IN BRIEF**, a 16-page booklet summarizing the major points detailed in the comprehensive guidebook. #EE-6519.



World Wildlife Fund

Educational Materials



Fisheries for the Future. *World Wildlife Fund* in cooperation with *Monetary Bay Aquarium and the Harbinger Institute*. As the demand for seafood continues to grow, the total world fish catch is declining and most fish stocks are past the stage of increasing production. What are the human, economic, and biological costs of fisheries mismanagement? How can we best manage our fisheries so that they are sustainable? This 4-part guide provides everything needed to engage citizens in thought-provoking discussions about these issues. It includes background information, perspective pieces, suggestions for further reading, and a supporting web site with additional information and hotlinks to other pertinent web sites. The guide provides civic and educational organizations, high schools and colleges, religious groups, governmental agencies, and others with a basis for meaningful dialogue aimed at understanding the issues and finding solutions. #EE-8702.

Media Kits

Wild Spaces, Wild Species—A Biodiversity Journey. *World Wildlife Fund*. Join WWF on a stunning photographic journey across the planet to explore Earth's incredible diversity of life. From the frosty reaches of the Bering Sea to the steamy rain forests of the Congo Basin, this slide show takes viewers to some of the most spectacular ecoregions on the planet all part of WWF's Global 200—a collection of more than 200 of the world's most outstanding terrestrial, freshwater, and marine habitats. These sites include those that harbor the most distinctive or rich biodiversity and also include those places where biodiversity loss will be most severely felt and where we must fight the hardest for conservation. Along the way, viewers will find out more about what biodiversity is, why it's important, and why it's threatened around the world. They will also learn more about the new thinking behind ecoregional conservation and the concrete actions people are taking around the world to protect our precious natural resources. The program is appropriate for young people and adults and includes 119 slides, an accompanying cassette tape with narration, and a CD-ROM version of the complete slide show. #EE-8702.

Maps

The Global 200: A Blueprint for Saving Life on Earth. *World Wildlife Fund*. This colorful, two-sided, 30" x 40" wall map produced by WWF highlights 233 of the richest, most diverse, and most threatened ecoregions on Earth. One side of the map details each of the ecoregions, while the other side shows the ecoregions' current level of vulnerability and threats affecting the entire globe (1998). #PO-7380.

Going, Going, Almost Gone! Animals in Danger Education Kit. *World Wildlife Fund* and *Home Box Office Biodiversity*, poaching, habitat loss, and other issues are explored in this award-winning 28-minute video and accompanying educator's guide and poster. Designed for elementary students, *Going, Going, Almost Gone!* is hosted by comedian Jim Fyfe and combines innovative animated segments with live-action footage and interviews with children. The video also features the voices of celebrity actors including Edward Asner, Judd Hirsh, Jasmine Guy, Marlo Thomas and others. The accompanying educator's guide includes key concepts, hands-on activities, and resources to help parents and teachers explore environmental issues with students. The video won an Emmy for best prime-time children's special and the prestigious Environmental Media Association Award for children's live action. Kit includes 28-minute video, 32-page educator's guide, and a dramatic 26" x 38" biodiversity poster entitled *Biodiversity: The Real World Wide Web*. #EE-5664.

Biodiversity! Exploring the Web of Life Education Kit. *World Wildlife Fund Earth Force*, and *WQED/Pittsburgh*. This award-winning video kit will open your students' eyes to the amazing world of biodiversity. The half-hour video features colorful footage, lively music, on-the-street interviews, short documentaries, and interviews with some of the world's leading biodiversity experts. Hosted by Wilson Cruz and Devon Odessa, two young stars from the highly acclaimed TV program, *My So Called Life*, the video explores what biodiversity is about, why it is important, what the status is worldwide, and what people can do locally. The kit also features a 21-page educator's guide designed for use with students in grades 6-10, and *WOW!—A Biodiversity Primer*, WWF's full color magazine-style resource for students. #EE-5663.

Additional Resources

The Biodiversity Collection, A Review of Biodiversity Resources for Educators. *World Wildlife Fund* in conjunction with the *North American Association for Environmental Education (NAAEE)*. This compendium of exemplary environmental education resources on biodiversity highlights 47 of the best supplementary curricula for grades K-12. It includes a general overview of biodiversity as a theme and an overview of the review criteria. Each listing includes a curriculum summary, grade level, subjects covered, comments from reviewers, and price. Suggestions on how to link related resources, web sites, and organizations are provided. #EE-6112.



World Wildlife Fund

Educational Materials



Environmental Education in the Schools. *Judy Brous and David Wood.* From role playing to action projects, this 512-page resource book, developed for the Peace Corps, highlights a variety of strategies educators use to promote environmental literacy and offers a planning process to help educators develop effective school-based environmental education programs. This guide includes details on how to conduct school environmental assessments, develop realistic plans for integrating environmental education into diverse teaching situations, create appropriate teaching activities for different ability levels, build support for new programs, measure success, and redirect programs based on feedback. More than 50 activities are organized into nine sections, and a helpful appendix and bibliography are included. Judy Braus is the Director of Education at World Wildlife Fund, and David Wood is an environmental science teacher at Sidwell Friends School in Washington, DC. #EE-3300.

Taking Action: An Educator's Guide to Involving Students in Environmental Action Projects. *World Wildlife Fund and Project WILD.* A collaborative project of World Wildlife Fund and Project WILD (a widely used wildlife education program), *Taking Action* helps educators plan, implement, and evaluate environmental education projects from organizing community recycling programs to creating community tree nurseries. The guide includes careful reviews of more than two dozen action projects throughout the United States, a detailed description of the planning process, and a comprehensive bibliography #EE-4003.

Posters

Biodiversity—From Sea to Shining Sea Poster Kit. *World Wildlife Fund.* This dramatic 22" x 34" two-sided poster celebrates World Wildlife Fund's *Windows on the Wild* biodiversity education program. The front of this colorful poster features twelve striking plant and animal images, celebrating the tremendous diversity of life on Earth. The back of the poster features a map depicting threatened ecoregions in the United States. The kit includes two posters (allowing educators to display both sides) and a 12-page educator's guide containing useful information about the importance of maintaining biodiversity along with creative suggestions for using the poster to stimulate discussion. #PO-5665.

World Wildlife Fund is a nonprofit conservation organization dedicated to protecting the world's biological diversity. For more information concerning WWF's conservation and education programs, please visit www.worldwildlife.org, or write at 1250 Twenty-Fourth Street NW, Washington, DC 20037.

KEEP CURRENT WITH WINDOWS ON THE WILD®

Visit the Windows on the Wild web site at www.worldwildlife.org/windows for the latest program updates and more information and biodiversity education resources. The site features interactive on-line versions of activities from our curriculum guides, downloadable samples that you can print out and use in your classrooms and programs, a calendar of events highlighting special community events and workshop opportunities, lists of recommended biodiversity education materials, and much more. Also sign up for the WOW e-mail list to stay up to date on the *Windows on the Wild* latest Windows on the Wild news, programs, and special events.

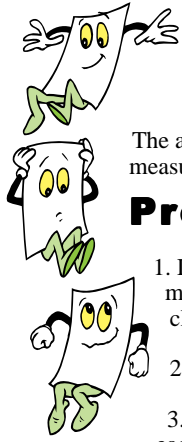
PENNIES FOR THE PLANET

Pennies for the Planet is a national program designed to educate kids about biodiversity and to help them understand the concept of ecoregional conservation. Pennies helps kids learn more about national and international conservation issues and encourages them to get involved in environmental action projects to protect and restore local biodiversity. Each year, Pennies for the Planet focuses on three ecoregions from WWF's Global 200—more than 200 globally outstanding sites around the world targeted for priority action by World Wildlife Fund and its partners. The Pennies for the Planet student newsletters contain information on the species, habitats, and environmental challenges facing each of the three highlighted ecoregions. Visit the Pennies web site at www.worldwildlife.org/windows/pennies to learn more and to get involved.

Biodiversity 911: Saving Life on Earth

WWF is developing a 2,300 square foot traveling exhibition on biodiversity, funded by a generous grant from the National Science Foundation with additional support from the Mars Foundation, the American Honda Foundation, and Eastman Kodak Company. The exhibition will travel to science centers, natural history museums, zoos, and aquariums around the United States and Canada over a three-year period. Working with Aardman Animations, the award-winning creators of Wallace and Gromit and the feature film *Chicken Run*, the exhibition will showcase an animated film that presents a creative introduction to biodiversity. Interactive stations featuring hands-on activities will complement the film and allow visitors to find out more about what biodiversity is, why it's important, and what people can do to conserve it. The exhibition will be supported with WOW's biodiversity education materials, an innovative on-line version of the exhibition, and biodiversity education workshops for formal and nonformal educators. For more information about hosting the exhibit, write to: Manager, Exhibition Services, Association of Science Technology Centers, 1025 Vermont Ave., NW, Suite 500, Washington, DC 20005 or by e-mail to mhand@astc.org.

Pollution Catchers



The air contains millions of tiny floating particles, some of which are air pollutants. Invite students to make pollution catchers to measure the amount of pollution found in different interior and exterior locations around your school.

Procedure:

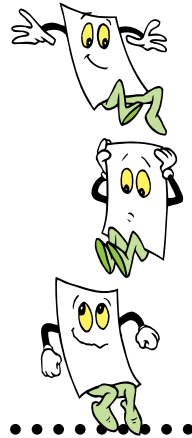
1. Decide on 5-12 different locations to place the pollution catchers. Some interesting places might include: school cafeteria, library, teachers lounge, principal's office, gym, bathroom, closet, playground, tree, lamp post, window, and outside front door.
2. Label each card with a location name. (Put one card aside and label it "control").
3. Smear each card (including the control card) with a thin layer of vaseline. Use tape to secure each pollution catcher to its correct location. Wrap the control card with clear plastic wrap and place it in a labeled envelope.

4. Leave the pollution catchers up for 1 week. Invite students to observe the cards during this time and have them keep notes on their findings. At the end of 1 week, have students remove the cards and wrap each one with clear plastic wrap.

5. When the cards are ready, have students use a magnifying glass or microscope to take a close-up look at each card and have them compare the cards to each other and the control card. After looking at the cards, have them discuss their findings and their previous observation notes.

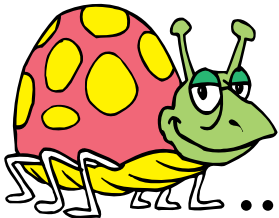
Materials:

- Plain index cards
- Vaseline
- Envelope
- Pen
- Clear plastic wrap
- Tape



Possible Discussion Questions:

- What kinds of particles are present? Describe what these particles look like. Where do you think these particles came from?
- Which card collected the most particles? Where was this card located?
- Which card, besides the control card, collected the least particles? Where was this card located?
- What do these results tell you about the school's air pollution?
- Is there more pollution inside or outside the school? Are you surprised by these results? Why?
- What are the main sources of air pollution? Where are these sources located?
- What can you do with these results? With whom can you share this information?
- How can school personnel improve air quality in and around the school?



What's Missing?

Use the hints below to figure out the missing consonants from the following "pollutant" words.

1. e i i e

2. a o o i e e a u

3. o o u o o a o

4. o u e o e a e

5. e i i e

6. i e

See page 9 for answers.



Hints • Hints

1. Not "bug" friendly.
2. Vehicle fumes.
3. Spray can insiders.
4. Indoor spot scrubbers.
5. Outdoor growth helper.
6. Ground clutter.

Brainstorms!

Invite students to bring in items that are normally considered throwaways...

- plastic milk jugs
- bottle caps
- paper towel rolls
- styrofoam meat trays
- pizza boxes
- yogurt containers
- film containers
- brochures
- holiday cards
- plastic spoons
- junk mail
- cereal boxes
- egg cartons
- six-pack plastic holders
- old gloves
- plastic bags

Have them brainstorm new uses for these items. Invite them to select their best ideas and implement a schoolwide "Use It, Reuse It" program that finds practical uses for these reusable materials.

Forest Ecology

TREES



This special section News focuses on one of the earth's most precious resources — trees, the largest of all plants and the oldest known living things.

Trees are important for a number of reasons: (1) they provide oxygen for us to breathe, (2) they prevent soil erosion by holding the soil together with their far-reaching roots, (3) they provide shelter and food for insects and animals, (4) they offer shade and privacy for more pleasant living, (5) they provide food and medicine for us to use in our daily lives, (6) they are useful for making homes and furniture, and (7) they add beauty and grace to any community setting. They truly make our lives better in so many ways and they offer a rich inheritance for future generations.

Although trees play such a vital role in the web of life, their existence is constantly challenged by natural and man-made threats, such as fire, acid rain, pollution, hurricanes, tornadoes, earthquakes, and clear-cutting. In order to prevent trees from becoming threatened and endangered species, we need to work together and create a future world in which trees can survive and thrive.

This newsletter provides teachers and students with a collection of useful resources, activity ideas, and background information for investigating trees in a scientific, challenging, and respectful way. We have included activities and discussion questions; lists of outstanding books, field guides, and videos; and useful addresses. We hope this special issue will help today's classrooms find interesting ways to study about the exciting world of trees!

**CELEBRATE
ARBOR
DAY
AND
EARTH
DAY!
EVERY DAY**



BZZZ!

The Beauty of a Tree

As I look at the tree outside,
I marvel at its beauty and size.
Providing shade and cleaner air;
I wonder what it's like up there—
In the treetops, way up high,
Reaching up towards the sky.

I look at all the critters go,
up and down and to and fro.
The birds enjoy the bugs and fruit;
They whistle and hum a solemn
salute.
The squirrels run atop the limbs,
Collecting nuts, while the
sunlight dims.

As evening nears, I walk away
From this giant by the bay.
I make a wish about this tree—
That its beauty will last for
eternity!

Project Idea

- **Create a local tree identification book.** Take photographs of trees in your school yard and community. Use field guides to identify and collect facts about each tree.
- Gather the following information about tree characteristics: height, girth, approximate age, bark (color, design, and texture), leaves and flowers (size, shape, color, and texture), and seeds (size, shape, color, texture, and seed dispersal method).
- Mount photographs and tree facts/descriptions on colored construction paper or poster board. Include pressed leaves and flowers, bark rubbings, and seed specimens if possible. Use a three-ring binder to organize the pages into alphabetical order. Present the finished product to the local library or town hall.

Plant Trees That Have Historical Roots!

American Forests, the nation's oldest nonprofit citizens' conservation organization, sponsors *The Famous and Historic Trees Project*, an exciting concept that combines contemporary conservation with America's historical heritage. This unique organization identifies trees from all across America and around the world that are associated with significant people or events in American history. They take the seeds from these one-of-a-kind trees, help them grow into small and healthy trees, and make them available to interested individuals.

American Forests' main goal focuses on planting and preserving trees all across America. Individuals can purchase trees for \$35.00 each and can choose from trees that once belonged to different historical periods (Colonial America, American Revolution, and Civil War) or famous people (presidents, artists, writers, inventors, war leaders, and politicians).

Some *American Forests* trees include:

- **Ronald Reagan Hackberry**
- **Antietam Sycamore**
- **Manassas Mimosa**
- **Clara Barton Redbud**
- **Dwight Eisenhower Cottonwood**
- **Martin Luther King Jr. Water Oak**
- **Orville and Wilbur Wright Sweetgum**
- **Napoleon Weeping Willow**

Each tree comes with its own complete planting kit to ensure a healthy start in its new home.

Every \$35.00 tree kit includes:

- 1) a personalized Certificate of Authenticity that tells the history of the tree
- 2) a one to three-foot container grown historic tree
- 3) detailed planting instructions
- 4) a photo-degradeable tree shelter
- 5) a stake for added support
- 6) fertilizer
- 7) safety net
- 8) an honorary membership in *American Forests* for six months (three issues of **American Forests Magazine**)

To order trees, please contact:

Famous and Historic Trees
8701 Old Kings Road
Jacksonville, FL 32219
1-800-320-TREE

American Forests also offers an educational program called "Living Classrooms." This program provides schools and organizations with lesson plans, trees, written resources, and materials for growing historical trees and becoming actively involved in the environment.

Lesson plans show educators and group leaders how to help children participate in hands-on activities involving science, history, conservation, language arts, geography, sociology, art, mathematics, and music.



**Seedlings from
The American Revolution**

- **BETSY ROSS SYCAMORE**
- **FAIRMOUNT PARK CHINESE SCHOLAR**
- **FORT TICONDEROGA NORTHERN WHITE CEDAR**
- **JOHN PAUL JONES PAPER BIRCH**
- **LAFAYETTE SYCAMORE**
- **INDEPENDENCE HALL BLACK LOCUST**
- **NATHAN HALE NORTHERN RED OAK**
- **PATRICK HENRY OSAGE ORANGE**
- **SARATOGA BLACK CHERRY**
- **VALLEY FORGE RIVER BIRCH**
- **WASHINGTON CROSSING SYCAMORE MAPLE**
- **WHITE PLAINS SYCAMORE**
- **WILLIAMSBURG GOLDEN RAINTREE**
- **WILLIAMSBURG WISTERIA**

Living Classrooms

The "Living Classrooms" Program includes:

- 20 Famous and Historic Trees, direct descendants of trees associated with important historical events or famous Americans
- 2 additional trees of choice each year during the class' three-year American Forests Membership
- Complete planting kit for each tree
- Famous and Historic Trees Teachers' Package (handbook for lesson plans and a specific pamphlet for each tree)
- **Growing Greener Cities**, a 60-page teachers' environmental education guide along with a detailed handbook and 12-minute class video
- A permanent outdoor *Grove Marker*
- 30 **Growing Greener Cities** tree-planting handbooks and *Global ReLeaf* bookmarks for students
- **World Forests: Striking a Balance Between Conservation and Development**, an interactive series of classroom exercises and take-home activities
- **The National Register of Big Trees**, a 48-page booklet that lists the largest of each native U.S. tree species
- A 10-minute classroom video that shows students and teachers how to designate Champion Trees (the largest of their species) in their community
- *A National Register of Big Trees Wall Calendar* for three years
- 3-year educational membership in American Forests that includes a subscription **American Forests Magazine** and **Urban Forests Magazine**

The cost of a "Living Classrooms" program is \$1,500. Teachers and group leaders who are interested in using this challenging program can: (1) look for a local company or organization to sponsor

Living Classrooms

them, (2) raise money through fund-raisers, or (3) contact *American Forests* directly, by writing a letter of interest and stating a need for corporate sponsorship or grant monies. *American Forests* has had great success in finding corporate sponsors and grant money for schools who are interested in participating in this unique program.

Educators interested in learning more about the "Living Classrooms" program and available funding should contact Laurie Mead or Susan Corbett at 1-800-320-TREE (1-800-320-8733). Letters of interest should be sent to:

American Forests
8701 Old Kings Road
Jacksonville, FL 32219

A complimentary copy of *American Forests Famous and Historic Trees* catalog accompanies this newsletter.



Do You Grow Each Year?

Longfellow, when asked the secret of his continued interest in life, pointed to a nearby apple tree.

He said, "The purpose of that apple tree is to grow a little new wood each year.
That is what I plan to do."

If you don't grow a little new wood each year, you'll become stagnant and chances for growth and opportunities will be minimized.

Source: *Potential*,
The Newsletter of People Building Institute
 330 Village Circle
 Sheldon, IA 51201.



Eyes on Nature



"The clearest way into the universe is through a forest wilderness."

John Muir

The "Eyes on Nature" section presents a collection of facts, background information, and student activities designed for children in grades K-12. Some activities are more advanced than others and may require teacher supervision. The following activities focus on the study of trees through different curricular areas, including: science, math, history, language arts, visual arts, and performing arts. The activities were developed by Debra L. Briatico.

- **Research the life of a famous naturalist and write a short biography.** Some famous naturalists might include: John James Audubon, Daniel Boone, John Chapman, John Muir, and Henry David Thoreau.
- **Go for a walk and listen to different trees.** What sounds are they making? What natural events are causing the trees to make sounds? Use an audio-tape recorder to capture the different sounds. Play the audio-tape for some friends and challenge them to identify the source of each sound.
- **Collect Tree Products.** Brainstorm a list of products made from trees. Share your list with other students and ask them to add suggestions. Bring your list home, walk around your house, and write down additional products. After one day of brainstorming, gather items from your list and make a display. The display can include actual products (paper, pencils, tools, toys, film, fabric, foods, gum, books, etc.), illustrations, posters, photographs, and/or models (boats, homes, furniture). Label each item and write a short description about its origin.
- **Organize a tree club.** Some activities might include: researching trees that grow in your community; growing seeds and planting trees; raising money for groups that are trying to save the rainforests, ancient forests, or tropical forests; and increasing awareness by spreading information about the importance of trees.
- **Compare the temperature of a completely sunny area with that of an area shaded by a tree.** During a one-week period, take various measurements throughout each day in a sunny spot and shady area. At the end of one week, make a chart comparing the temperatures of the two areas. Share the results and discuss the importance of shade in extremely hot climates.
- **Write a shape poem about a special tree.** Include descriptions about the tree's characteristics and reasons why this tree holds such an important place in your heart.

ARBOR DAY HISTORY

*"Other holidays repose upon the past.
Arbor Day proposes for the future."*

J. Sterling Morton

In olden times, people planted trees as a way of celebrating spring. This tradition took on new meaning in the prairie state of Nebraska during the late 1800's when J. Sterling Morton began planting trees to benefit farmers and pioneers. The nearly treeless plain needed trees to prevent soil erosion and provide building materials, windbreaks, fuel, and shade.

J. Sterling Morton, a journalist and editor for Nebraska's first newspaper used this forum to spread agricultural information and his enthusiasm for trees. After becoming secretary of the Nebraska Territory, he proposed a tree-planting holiday "Arbor Day" at a meeting of the State Board of Agriculture on January 4, 1872. The date of April 10, 1872 was chosen for the first Arbor Day. The local officials offered prizes to counties and individuals who properly planted the largest number of trees on that day. According to estimates, more than one million trees were planted in Nebraska on the first Arbor Day.

In 1885, Arbor Day became a legal holiday in Nebraska and April 22 (Morton's birthday) was selected as the date for its permanent observance. During the 1870's, other states passed legislation to observe Arbor Day. Today Arbor Day is observed in the United States and many countries around the world. The dates for Arbor Day celebrations depend on the best tree-planting weather for the state or country. Several U.S. presidents have proclaimed a National Arbor Day on the last Friday of April. (Please see page 14 for Arbor Day dates).



Eyes on Nature



"A people without children would face a hopeless future; a country without trees is almost as hopeless."
Theodore Roosevelt

- **Measure the height of a tree.** Select a tree and locate a spot nine yards from the tree. Have a friend stand at that spot holding a broom perpendicular to the ground. Move yourself one more yard from your friend (10 yards from the tree) and lay down on the ground.

With your head close to the ground, look up at the top of the tree and make an imaginary line from where you are laying to the highest point of the tree. Have your friend mark the place where the top of the tree intersects with the broom handle.

Measure the height of the mark on the broom and multiply it by 10 to estimate the height of the tree. For example, if the height of the broom handle is 6 feet, then the height of the tree is approximately 60 feet tall.

(Invite students to measure the height of trees in the school yard and community. Have them compare the different measurements and make a chart listing all the tree heights ranging from tallest to shortest. Ask them to also calculate the average tree height in your community.)

- **Create a "nature walk" mobile.** Go on a nature walk and collect interesting twigs, leaves, seeds, nuts, pine cones, and other natural tree products. Find some string and attach favorite items to a tree branch. Hang the mobile from the wall or ceiling.

- **Make a leaf and flower press.** A great way to preserve leaves and flowers is to press them. First, take two pieces of 1/4" plywood and cut them into 8" x 8" squares. Drill holes in the four corners of each board and attach the two boards together with long bolts and wing nuts.

Cut several pieces of heavy cardboard into 6" x 6" squares (corrugated cardboard from large boxes works best). As you find leaves and flowers to press, place them in between sheets of clean paper, tissue paper or wax paper. Insert these pages into the layers of cardboard and place them in between the two plywood boards.

Tighten the wing nuts evenly at all four corners and put enough pressure on the leaves and flowers to press them flat. The pressed specimens should be ready within two to three weeks. When the leaves and flowers are pressed, you can use them to create beautiful pressed flower arrangements, make a leaf and flower identification book, decorate gifts, design note cards, and much more.

- **Write and illustrate a picture book about the life cycle of a tree.** Select a deciduous or coniferous tree and research the steps involved in its life cycle. Write a story about the tree from seed germination to full adult growth. Include colorful illustrations and/or photographs.

Poems to Treasure

Trees

Joyce Kilmer

I think that I shall never see
 A poem lovely as a tree

A tree whose hungry mouth is pressed
 Against the earth's sweet flowing breast;

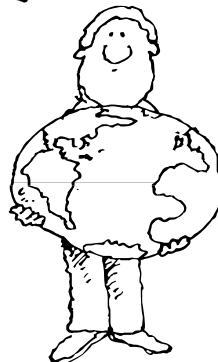
A tree that looks at God all day
 And lifts her leafy arms to pray;

A tree that may in summer wear
 A nest of robins in her hair;

Upon whose bosom snow has lain;
 Who intimately lives with rain.

Poems are made by fools like me,
 But only God can make a tree.

**IT'S
 ALL
 YOURS!**



The Tree Planter

Stanley Foss Bartlett

Whoever planted rows of trees
 Beside the roads and lanes,
 God rest his soul in Heavenly peace
 And bless him for his pains;
 For he who gave of time and toil,
 Who gave of heart and hand
 To nurse the tender shoots that were
 To shade the ways of man,
 Was quite as great as those who built
 Of stone and minted gold—
 No need to cast his name in bronze,
 His deeds need not be told.



Eyes on Nature



"Next to the earth itself the forest is the most useful servant of man."

Gifford Pinchot

- **Make a leaf rubbing.** Collect leaves of varying shapes and sizes. Gather the following materials: white paper or construction paper, crayons or colored chalk, and newspaper. Place leaf wrong-side up (veins showing) on a piece of paper. Place a sheet of paper over the leaf and using the flat side of the crayon, rub over the paper with steady, firm strokes. The leaf shape will appear on the paper.

- **Make recycled paper.** Tear several sheets of paper (newspapers, construction paper, lined paper) into 1" pieces. Soak in a bucket filled with water for several hours or overnight.

Pour water and 1/2 cup of the wet paper into a blender and mix for 30 seconds. Pour the pulp mixture into a dish pan and use two hands to scoop a screen (window screen stapled onto a 8" x 8" wooden frame) into the mixture, sliding it back and forth. After the pulp collects on the screen, lift it straight up and let water drain.

Place a layer of newspaper above and below the screen and press out excess water. Turn the screen over (so the pulp is on the bottom) and set it on a flat surface. Carefully lift the screen off the wet paper and using another layer of newspaper, press out left over water.

Gently peel the damp paper off the newspaper and let the recycled paper dry on a flat surface. Dry overnight or use a heated iron to press the paper.

- **Use natural dyes to add color to recycled paper.** To prepare dyes made from natural materials (fruits, vegetables, and plants—stems, roots, flowers) go on a nature walk and gather flowers, berries, and leafy materials. (See chart below for suggestions). Place whole berries and torn pieces of plant materials (chop plant parts into small pieces) into a cooking pot, add water (the amount of water will determine the dye's color—more water/lighter color, less water/darker color), cover mixture with lid, and bring to a boil.

Simmer the mixture for approximately 30 minutes to 1 hour, stirring occasionally. Remove the pot from heat and let cool. Use a colander, strainer or piece of cheese cloth to strain the mixture over a bowl. Add a tablespoon of vinegar to the dye to set and preserve the color. Pour the colored dye into storage containers and label each container.

Add the natural dyes to your recycled paper during the soaking phase of the project. Let paper and water mixture soak overnight. In addition to adding natural dyes, flowers and leaves can be added to pulp mixture to create unique stationery.

Natural Dyes

<u>Color</u>	<u>Plant Materials</u>
Blue	red cabbage leaves, sunflower seeds, larkspur petals, blueberries
Green	carrot tops, grass clippings, spinach leaves, moss, ragweed leaves, heather (tips), hyssop leaves, yarrow (flower), lily of the valley (leaves and stalks), parsley leaves, privet leaves and stalks
Peach	agrimony (leaves and stalks), broom (flowers)
Purple	blackberries, elderberries, dandelion roots (red-violet), cedar root
Red	cherries, birch bark (gathered from the ground), red hollyhock flowers, dogwood root bark, bloodroot (roots), red onion skin, willow bark, strawberries, raspberries, cranberries, beets
Tan	walnut shells, tea leaves, instant coffee, butternut husks, stinging nettle (everything but roots), yellow onion skins
Yellow	goldenrod, saffras flower, pomegranate rinds, onion skins, willow tree leaves, marigolds, orange peels, chamomile flowers, celandine flowers, comfrey leaves, dandelion flowers, fenugreek (seeds), queen anne's lace (flowers and stalks), tansy flowers



Eyes on Nature



"Trees add so much to our towns and cities. The beauty of trees is a constant joy to those who live near them."

John Rosenow

- **Make a leaf print.** Collect leaves of all different shapes and sizes. Gather the following materials: white or colored construction paper, large sheets of tissue paper, or rolls of craft paper; acrylic or poster paints (various colors); paint brush; paper towels; and rolling pin or spoon.

Paint a little acrylic or poster paint on the underside of the leaf (the veins should be more pronounced). Place the "inked" leaf on a piece of paper (ink-side down) and cover it with some paper towels. Use a rolling pin or spoon to press the leaf with firm, even strokes. Remove the paper towel and "inked" leaf and you will have a lovely leaf print.

Use these leaf prints to make wrapping paper, book covers, note cards, gift bags, and t-shirts.

- **Start a tree journal.** Find a tree that is special to you and start writing observations about it in a journal. Some journal entries might include: characteristics of the tree (size, shape, color, and texture of leaves, bark, fruit, and seeds); times and dates of new blooms and other noticeable changes; descriptions of animal visitors and other tree-dwellers (insects and birds); tree measurements (height, girth, and width); descriptions of any tree injuries or damage; feelings evoked by this tree; and any noises made by the tree. In addition to written entries, include illustrations, leaf/bark rubbings, photographs, and leaf, bark, and/or seed specimens.
- **Use the SCAMPER technique and brainstorm new uses for tree products.** The SCAMPER technique is a creative thinking tool that is designed to help individuals view an idea or object from more than one perspective. The SCAMPER acronym stands for (Substitute, Combine, Adapt, Modify, Put to other uses, Eliminate,

and Reverse/Rearrange). Use these words to help you think of new uses for different tree products, such as: cork, acorns, chestnuts, maple seeds, coconuts, bark, gum, coffee beans, and pine needles.

State Trees

Alabama	Longleaf Pine
Alaska	Sitka Spruce
Arizona	Paloverde
Arkansas	Shortleaf Pine
California	California Redwood
Colorado	Colorado Blue Spruce
Connecticut	White Oak
Delaware	American Holly
Florida	Cabbage Palmetto
Georgia	Live Oak
Hawaii	Kukui
Idaho	Western White Pine
Illinois	White Oak
Indiana	Tulip Tree
Iowa	Oak
Kansas	Cottonwood
Kentucky	Coffee Tree
Louisiana	Bald Cypress
Maine	Eastern White Pine
Maryland	White Oak
Massachusetts	American Elm
Michigan	Eastern White Pine
Minnesota	Red Pine
Mississippi	Southern Magnolia
Missouri	Flowering Dogwood
Montana	Ponderosa Pine
Nebraska	Cottonwood
Nevada	Single-leaf Pinyon
New Hampshire	Paper Birch
New Jersey	Red Oak
New Mexico	Pinyon
New York	Sugar Maple
North Carolina	Pine
North Dakota	American Elm
Ohio	Ohio Buckeye
Oklahoma	Redbud
Oregon	Douglas Fir
Pennsylvania	Eastern Hemlock
Rhode Island	Red Maple
South Carolina	Palmetto
South Dakota	White Spruce
Tennessee	Yellow Poplar
Texas	Pecan
Utah	Blue Spruce
Vermont	Sugar Maple
Virginia	-----
Washington	Western Hemlock
West Virginia	Sugar Maple
Wisconsin	Sugar Maple
Wyoming	Cottonwood

Ask students to pretend they are seeds. Have them describe their journey from the parent tree to their final growing destination.





Eyes on Nature



"The cultivation of flowers and trees is the cultivation of the good, the beautiful, and the ennobling in man..."

J. Sterling Morton, Founder of Arbor Day

Investigate tree-grown foods. Trees produce hundreds of edible fruits, nuts, spices, and herbs. Brainstorm a list of tree-grown foods. After ten-fifteen minutes, combine your list with other classmates' lists. Discuss the class list and add any other items.

After the list is finished, select twenty items from the class list and assign one item to each student. Everyone in your class becomes responsible for bringing in a sample of their tree-grown item (the quantity should be large enough for each student to have a small taste and an opportunity to dissect and investigate the food). Possible items might include: apples, pears, oranges, grapefruits, coconuts, lemons, cherries, plums, peaches, pineapples, avocados, bananas, walnuts, figs, mangoes, cinnamon, olives, coffee beans, and cloves.

Remind students who are bringing in tree-grown produce to properly wash and dry each item. When all of the items are collected and brought to school, cut them in half (cross-section) and study the interiors and exteriors of each item. Use your five senses to closely investigate the tree-grown foods. *Smell* the items; *feel* the outside and inside textures; *look* at the size, shape, colors, patterns, thickness of outer covering, and presence of any seeds; *listen* to the sounds they make when squeezed or dropped on a table; and *taste* a small sample of each food.

As you investigate each tree-grown food, record notes in an observation journal. After everyone has had an opportunity to investigate the twenty items, hold a classroom discussion and share observations, expectations, and feelings towards this activity.

Extensions

Dissect your favorite items by using a magnifying glass and/or microscope.

Weigh each item and make a chart that records the range of weights from heaviest to lightest.

Design a survey that asks each student to select his/her favorite and least favorite tree-produced foods.

Classify the tree-produced foods according to shape, color, texture, taste (sweet, sour, salty, bitter), presence of seeds, presence of outer protection (shell or peeling), and other categories.

Create a matching game that asks players to match a seed to a tree-grown fruit. Use seed specimens and photographs/illustrations of fruit to make game cards.

Preserve leaves. Collect a variety of undamaged leaves. Place each leaf in between two pieces of wax paper (waxy surface on the inside). Make sure the wax paper completely covers both sides of the leaf. Place a dishtowel or fabric sheet over the wax paper and carefully use a hot iron to press the leaf specimen. This process prevents leaves from drying out and becoming brittle.

Collect and press leaves at different times during the year. Study the changes in leaf color, size and texture. Start a leaf collection and mount preserved leaves on pieces of heavy construction paper or poster board. Label each leaf and include interesting facts and descriptions about each specimen.

Make a bark rubbing. Place a piece of white paper over a tree's bark and use string to fasten the paper to the tree trunk. When the paper is secure, take a dark-colored crayon and hold it flat against the paper. Rub vigorously back and forth & up and down, but not hard enough to rip the paper. When the bark's imprint is transferred to the paper, remove it from the tree.

Make 5-10 bark rubbings of different trees in your school yard and community. After making the rubbings, compare the bark patterns and textures. Use a field guide to identify each tree and label the bark rubbings. Display the rubbings on a bulletin board or wall chart.

Useful Addresses

American Forestry
Association
1516 P Street NW
Washington, DC 20005
(202) 955-4500 x 220

National Arbor Day
Foundation
100 Arbor Avenue
Nebraska City, NE 68410
(402) 474-5655

National Audubon Society
700 Broadway
New York, NY 10003
(800) 274-4201

National Wildlife Federation
1400 16th Street, N.W.
Washington, DC 20036
(202) 797-6800

Redwood National Park
1111 2nd Street
Crescent City, CA 95531
(707) 464-6101

Sequoia National Park
P.O. Box 89
Sequoia, CA 93262

Sierra Club
85 - 2nd Street, 2nd Floor
San Francisco, CA 94105

Trees for Life
3006 West St. Louis Street
Wichita, KS 67203
(316) 945-6929

Tree Quests

This list of questions is designed to develop students' critical and creative thinking skills, as well as increase their knowledge about trees. Students can use these questions as springboards for more advanced research projects.



When and where did the tradition of having Christmas trees originate? Why do so many people continue to honor this tradition?

What trees do not have leaves? How do these trees function without leaves?

What is the most common color of leaves, besides green? How many different colors are represented in tree leaves?

How does a tree clean polluted air? What tree parts serve as filters?

How are trees like humans? Compare and contrast the systems of the tree with human systems, such as circulatory, integumentary, and respiratory. Chart similarities and differences in a Venn diagram.

How are trees in the rainforest different from those living in a desert? Compare the size (height and girth), shape, color, and bark texture of a Kapok tree and Saguaro (giant cactus). Which tree is more durable? What seeds and fruits do they produce?

How do trees differ from other plants?

How old is the oldest tree in America? Where is this tree located?



What changes does a tree experience in one year? Select a deciduous or coniferous tree and describe every change the tree undergoes from one season to the next.

Do insects help or hinder tree growth? Which insects help tree growth? Which insects harm trees?

Why are people cutting down the trees in rainforests?

How is paper made? Research the steps involved in making paper. How do these steps differ from those followed when making recycled paper? Compare and contrast the texture and durability of three brands of paper, including recycled paper.

Where in the world is most recycled paper produced? Does it cost more to produce paper or recycled paper? What resources are used to make recycled paper?

Who invented the pencil and when was it invented?

Why and how does wood float? Are there any trees that do not float in water? If so, which trees do not float? Which wood is the heaviest? lightest?

What role do trees play in a forest food chain? Draw a diagram illustrating the relationship between trees & animals, birds, and insects.

How many different types of fruits, nuts, and spices grow on trees? Compile a list of tree-grown products and classify them by shape, size, color, texture, and use.

What animals live in or around trees? What happens to these animals when a forest fire or clearcutting causes trees to die?

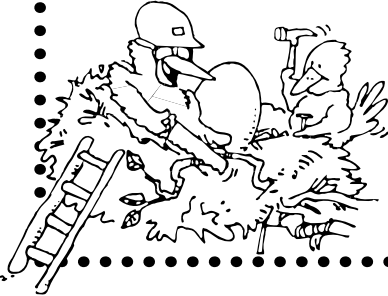
How many different ways are seeds dispersed from the mother tree? Classify tree seeds according to various seed dispersal methods.

How many different species of trees live on earth? Which trees are most abundant? Which trees are currently threatened or endangered?

What potential threats against trees currently exist? List natural and man-made threats and discuss which causes are more dangerous and why.

Books to Grow On!

TREE-MENDOUS RESOURCES



We have compiled a list of outstanding picture books, non-fiction books, and field guides that focus on the topic of "Trees." These books provide a great foundation for a K-12 unit on ecology, conservation, botany, nature, life cycles, habitats, seasons, and ecosystems.

Backyard Explorer Kit: Leaf and Tree Guide & Leaf Collecting Album. (1989). Written by Rona Beame. Illustrated by Lionel Kalish. Published by Workman Publishing. Paperback. ISBN: 0-89480-343-3. (Ages 8-12). Activity Kit.

Be A Friend to Trees. (1994). Written by Patricia Lauber. Illustrated by Holly Keller. Published by HarperCollins Children's Books. Hardcover. ISBN: 0-06-021528-3. Paperback. ISBN: 0-06-445120-8. (Ages 4-8). Picture Book.

Crinkleroot's Guide to Knowing the Trees. (1992). Written by Jim Arnosky. Published by Bradbury Press, a division of Simon and Schuster Books. Hardcover. ISBN: 0-02-705855-7. (Ages 4-8). Picture Book.

Dinosaur Tree. (1994). Written by Douglas Henderson. Published by Bradbury Press, a division of Simon and Schuster Books. Hardcover. ISBN: 0-02-743547-4. (Ages 6-10). Picture Book.

Earth's Vanishing Forests. (1991). Written by Roy A. Gallant. Published by Macmillan Children's Books. Hardcover. ISBN: 0-02-735774-0. (Ages 12 and up). Nonfiction.

Giants in the Land. (1993). Written by Diana Appelbaum. Illustrated by Michael McCurdy. Published by Houghton Mifflin Company. Hardcover. ISBN: 0-395-64720-7. (Ages 7-10). Picture Book.

The Gift of the Tree. (1992). Written by Alvin Tresselt. Illustrated by Henri Sorensen. Published by Lothrop, Lee & Shepard, a division of William Morrow and Company. Hardcover. ISBN: 0-688-10684-6. (Ages 5 and up). Picture Book.

The Giving Tree. (1964). Written by Shel Silverstein. Published by HarperCollins Children's Books. Hardcover. ISBN: 0-06-025665-6. (All ages). Picture Book.

The Great Kapok Tree: A Tale of the Amazon Rain Forest. (1990). Written by Lynne Cherry. Published by Harcourt, Brace and Company. Hardcover. ISBN: 0-15-200520-X. (Ages 4-8). Picture Book.

Mighty Tree. (1992). Written by Dick Gackenbach. Published by Harcourt, Brace and Company. Hardcover. ISBN: 0-15-200519-6. (Ages 4-8). Picture Book.

Night Tree. (1991). Written by Eve Bunting. Illustrated by Ted Rand. Published by Harcourt Brace and Company. Hardcover. ISBN: 0-15-257425-5. Paperback. ISBN: 0-15-200121-2. (Ages 4-8). Picture Book.

Red Leaf, Yellow Leaf. (1991). Written by Lois Ehlert. Published by Harcourt, Brace and Company. Hardcover. ISBN: 0-15-266197-2. (Ages 4-8). Picture Book.

Scholastic Voyages of Discovery: Trees and Forests. (1995). Editions by Gallimard Jeunesse. Published by Scholastic. Hardcover. ISBN: 0-590-47639-4. (Ages 8 and up). Nonfiction.

The Season's of Arnold's Apple Tree. (1984). Written by Gail Gibbons. Published by Harcourt Brace and Company. Hardcover. ISBN: 0-15-271246-1. Paperback. ISBN: 0-15-271245-3. (Ages 4-8). Picture Book.

Someday A Tree. (1993). Written by Eve Bunting. Illustrated by Ronald Himler. Published by Clarion Books. Hardcover. ISBN: 0-395-61309-4. (Ages 5-8). Picture Book.

Song for the Ancient Forest. (1993). Written by Nancy Luenn. Illustrated by Jill Kastner. Published by Atheneum, a division of Macmillan Children's Books. Hardcover. ISBN: 0-689-31719-0. (Ages 6-9). Picture Book.

Books to Grow On!

TREE-MENDOUS RESOURCES

The Tiny Seed. (1987). Written by Eric Carle. Published by Simon and Schuster Books for Young Readers. Hardcover. ISBN: 0-88708-015-4. Paperback. ISBN: 0-88708-155-X. (Ages 4-8). Picture Book.

The Tree. (1989). Written by Gallimard Jeunesse and Pascale De Bourgoing. Illustrated by Christian Broutin. Published by Scholastic, Inc. Hardcover. ISBN: 0-590-45265-7. (Ages 3-6). Nonfiction Book—First Discover Series.



A Tree Is Nice. (1956). Written by Janice May Udry. Illustrated by Marc Sinont. Published by HarperCollins Books for Children. Hardcover. ISBN: 0-06-0256155-2. Paperback. ISBN: 0-06-443147-9. (Ages 5-8). Picture Book. 1957 Caldecott Medal Winner.

Trees. (1993). Written by Linda Gamlin. Published by Dorling Kindersley. Distributed by Houghton Mifflin Company. Hardcover. ISBN: 1-56458-230-2. (Ages 8-12). Nonfiction Book—Eyewitness Explorers Series.

Field Guides

Students and teachers can use these field guides when collecting, identifying, classifying, and studying trees and leaves.

The Audubon Society Pocket Guide: Familiar Trees of North America (Eastern Region). (1986). Edited by Ann Whitman. Published by Alfred A. Knopf. Paperback. ISBN: 0-394-74851-4.

The Audubon Society Pocket Guide: Familiar Trees of North America (Western Region). (1986). Edited by Ann Whitman. Published by Alfred A. Knopf. Paperback. ISBN: 0-394-74852-2.

Eyewitness Handbooks: Trees. (1992). Written by Allen J. Coombes. Photographs by Matthew Ward. Published by Dorling Kindersley. Paperback. ISBN: 1-56458-072-5.

National Audubon Society Field Guide to North American Trees (Eastern Region). (1990, 1994). Written by Elbert L. Little. Published by Alfred A. Knopf. Paperback. ISBN: 0-394-50760-6.

National Audubon Society Field Guide to North American Trees (Western Region). (1990, 1994). Written by Elbert L. Little. Published by Alfred A. Knopf. Paperback. ISBN: 0-394-50761-4.

Peterson Field Guides: A Field Guide to Trees and Shrubs. (1986). Written by George A. Petrides. Illustrated by George A. Petrides and Roger T. Peterson. Published by Houghton Mifflin Company. Paperback. ISBN: 0-395-17579-8.

Peterson First Guides: Trees. (1993). Written by George A. Petrides. Illustrated by Olivia Petrides and Janet Wehr. Published by Houghton Mifflin Company. Paperback. ISBN: 0-395-65972-8.

Simon & Schuster's Guide to Trees. (1977, 1978). Written by Paola Lanzara and Mariella Pizzetti. Published by Simon & Schuster, Inc. Paperback. ISBN: 0-671-24125-7.

Taylor's Guide to Trees. (1961). Norman Taylor. Published by Houghton Mifflin Company. Paperback. ISBN: 0-395-46783-7.

Outstanding Videos and Filmstrips



The National Geographic Society has created a collection of videos and filmstrips about trees, seasons, ecology, ecosystems, and habitats. These viewing materials can be purchased from:

*National Geographic Society
Educational Services
P.O. Box 98019
Washington, DC 20090-8019.
Phone: 800-368-2728.
Fax: 301-921-1575.*

All About Trees. (1990). Two 16-minute sound filmstrips. These two filmstrips introduce students to tree growth, basic tree structures, tree-produced food, the tree-animal relationship, threats to trees, and the preservation of today's trees. (Grades K-4).

Ancient Forests. (1992). 25-minute color video. Viewers will travel from Tongass National Forest and Prince of Wales Island in Alaska to northern California and marvel at the ancient trees along the Pacific coast. (Grades 7-12).

Kingdom of the Plants. (1974). Five 13 or 14-minute sound filmstrips. This collection of filmstrips explores the roles of plants in our society. Titles include: *Green Life, Simple Plants, Complex Plants, Trees, and Plants Serving Man.* (Grades 5-12).

Let's Explore a Forest. (1994). 17-minute color video. Adrienne and her uncle Jerome visit the Tennessee Smoky Mountains and learn about transpiration, photosynthesis, the differences between deciduous trees and evergreens, and animals that make their home in the forest. (Grades 4-6).

Old-Growth Forest: An Ecosystem. (1994). 25-minute color video. While viewing the old-growth forest of the Pacific Northwest, students will observe the interactions between plants and animals and learn about ecological concepts such as: predator-prey relationships, decomposition, adaptation, succession, recycling of nutrients, and symbiosis. (Grades 7-12).

Photosynthesis: Life Energy. (1983). 22-minute color video. Scientists introduce the mechanics of photosynthesis, including the light and dark reactions of this basic life process. (Grades 7-12).

Seeds and How They Travel. (1983). 16-minute sound filmstrip. This filmstrip examines the basic structure of a seed, explores how seeds develop into plants, discusses why seeds are important to all living things, and describes how different seeds travel. (Grades K-4).

The World of Plants. (1976). Five 12 or 13-minute sound filmstrips. In this series of five filmstrips, students will be introduced to plant structure and growth, simple and complex plants, plant adaptations, and the different ways people use plants. (Grades K-4).

Trees for Life. (1995). 17-minute color video. In this video from the *On Nature's Trail Series*, four young adventurers set out to find a songbird that once lived in a recently cut-down tree. While these students explore several forests, including tropical, old-growth and underwater, they discover various animals and insects that live on trees and learn about the advantages of having trees on earth. (Grades K-3).

The Video Project distributes a collection of videos focusing on old-growth forests and deforestation. These videos can be purchased from:

*The Video Project
Films and Videos for a Safe & Sustainable World
5332 College Avenue, Suite 101
Oakland, CA 94618.
Phone: 800-4-PLANET.
Fax: 510-655-9115.*

Battle for the Trees. 57-minute color video. This video documents the clearcutting of an ancient forest in Coastal British Columbia. This film presents passionate commentary from both sides of the issue (forestry experts, logging company officials, environmentalists, and native people) and takes an effective look at the impact of clearcutting, alternative solutions, and the role of multi-national corporations who are increasingly logging old-growth forests. (Grades 10-12+).

Saviors of the Forest. 90-minute video. This video follows the adventures of two Los Angeles filmmakers as they learn about the complex causes of rainforest destruction. (Grades 10-12+).

The Forest Through the Trees. 58-minute color video. This video takes a sobering look at the battle over the last remaining virgin Pacific redwoods in private hands. This highly-acclaimed film goes behind the headlines to examine the central issues of this dispute according to different groups: loggers, timber executives, politicians, environmentalists, and local residents. (Grades 9-12).



Arbor Day Dates



Many states observe Arbor Day on different dates according to their best tree-planting times.

- Alabama**—Last full week in February
- Alaska**—Third Monday in May
- Arizona**—Friday following April 1st
(Apache, Navajo, Coconino, Mohave, and Yavapai counties);
Friday following February 1st
(all other counties)
- Arkansas**—Third Monday in March
- California**—March 7th-14th
- Colorado**—Third Friday in April
- Connecticut**—April 30th
- Delaware**—Last Friday in April
- District of Columbia**—Last Friday in April
- Florida**—Third Friday in January
- Guam**—First Friday in November
- Georgia**—Third Friday in February
- Hawaii**—First Friday in November
- Idaho**—Last Friday in April
- Illinois**—Last Friday in April
- Indiana**—Second Friday in April
- Iowa**—Last Friday in April
- Kansas**—Last Friday in March
- Kentucky**—First Friday in April
- Louisiana**—Third Friday in January
- Maine**—Third full week in May
- Maryland**—First Wednesday in April
- Massachusetts**—April 28th-May 5th
- Michigan**—Third full week in April

- Minnesota**—Last Friday in April
- Mississippi**—Second Friday in February
- Missouri**—First Friday after the first
Tuesday in April
- Montana**—Last Friday in April
- Nebraska**—Last Friday in April
- Nevada**—Southern (Feb. 28th) and
Northern (April 23rd)
- New Hampshire**—Last Friday in April
- New Jersey**—Last Friday in April
- New Mexico**—Second Friday in March
- New York**—Last Friday in April
- North Carolina**—First Friday following
March 15th
- North Dakota**—First Friday in May
- Ohio**—Last Friday in April
- Oklahoma**—Last full week in March
- Oregon**—First full week in April
- Pennsylvania**—Last Friday in April
- Rhode Island**—Last Friday in April
- South Carolina**—First Friday in
December
- South Dakota**—Last Friday in April
- Tennessee**—First Friday in March
- Texas**—Fourth Friday in April
- Utah**—Last Friday in April
- Vermont**—First Friday in May
- Virginia**—Second Friday in April
- Virgin Islands**—Last Friday in September
- Washington**—Second Wednesday in
April
- West Virginia**—Second Friday in April
- Wisconsin**—Last Friday in April
- Wyoming**—Last Monday in April

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 : *National Arbor Day is observed* :
 : *the last Friday in April* :
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