



Educators Earth Day Sourcebook

Grades K — 6



You Can Make A Difference



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D C 20460

THE ADMINISTRATOR

**An Earth Day Message To Educators
From William K. Reilly
Administrator, U.S. Environmental Protection Agency**

January, 1990

Dear Educators:

Thank you for your willingness to teach your students about Earth Day and the environment.

Although Earth Day is April 22, all across the U.S.A. and in many places around the world educational events of all kinds will be held the week before and the week after. We at EPA are working hard to make sure that Earth Day is not a "one-time" event, but rather that it triggers long-term education and action to improve the environment.

Many of you, I'm sure, recall Earth Day, 1970. It may be useful to you to have some background on that event and subsequent activities. In the late 1960s, a series of environmental horror stories gave rise to the first Earth Day in 1970 as citizens across the land raised the alarm. Rivers caught on fire. Cities were routinely enshrouded by thick clouds of industrial pollution. Raw sewage was discharged into rivers. Automobiles released ten times the emissions of today's cars. Oil spills occurred regularly. And people said, "Enough!"

Soon thereafter, the Environmental Protection Agency was formed to address these and other problems. By the late 1970s, dramatic progress was evident in water quality, reduced automobile emissions, and waste disposal. By Earth Day's tenth anniversary in 1980, however, a second wave of environmental challenges became paramount, often more subtle and difficult to address. Evidence of toxic chemicals appeared everywhere: in food, water, soil, and the air. Now, as the twentieth anniversary of Earth Day approaches, environmental threats are even more daunting: acid rain, global warming, habitat destruction, loss of wildlife, and stratospheric ozone depletion.

What should we do? What can we do? First, we must recognize that, in one way or another, every sector of the economy — agriculture, housing, transportation, energy — and each of us as consumers contribute to these problems. As President Bush said, "Through millions of individual decisions — simple, everyday, personal choices — we are determining the fate of the earth. So the conclusion is also simple: we're all responsible, and it's surprisingly easy to move from being part of the problem to being part of the solution."

We cannot succeed without educating all sectors of society and involving people in meeting the challenges ahead. We must act and we must act together. We must start preventing pollution before it occurs.

Please urge your students and colleagues to join the Earth Day celebrations that will take place in your community. Help them become active in meeting the environmental challenges ahead.

Sincerely yours,

William K. Reilly

Teachers And Librarians

Please help spread the word about Earth Day 1990 in your school. Earth Day is vitally important because it focuses the attention of the nation on the state of the planet. Our request to you is that you share this information with all the administrators, teachers, and students in your school — and reach out to parents and the community with your activities so that everyone can participate and do something **NOW** to protect the environment.

Environmental issues often seem overwhelming. Yet some actions can be taken by students and their families which are not difficult but which can be very helpful; they may even result in habits which will endure. This booklet provides many ideas for activities covering all subject areas of the curriculum plus home and community activities in which students from kindergarten through sixth grade can participate to bring their attention to the prevention of pollution. These activities emphasize recycling, tree planting, water conservation and energy conservation. Here are some important facts everyone should know:

- **Why recycle?** Garbage . . . solid waste . . . refuse . . . trash! The waste we produce in our homes and businesses adds up to a massive pile of waste — a total for the nation of about 160 million tons a year. And the garbage problem is growing steadily; if we don't change the way we deal with garbage, we could be producing 193 million tons a year by the year 2000. Usually, in making and using products, three things happen that affect the environment: the amount of the Earth's limited supply of valuable natural resources is reduced, the energy used to produce and distribute the products may contribute to air pollution, acid rain, and global warming, and these products can become part of the garbage that has to be buried in overflowing landfills or burned in expensive incinerators. To help prevent pollution, the Environmental Protection Agency has set a goal of reducing the amount of waste we dispose in 1992 to three-fourths of today's volume. You

can help by not using disposable items and by recycling. Recycling means making further use of something you would otherwise throw away. Today, about 80% of what Americans throw away is recyclable. Here is how many things are recycled:

- By adding water, most used paper can be turned into a mush that is then made into new paper.

- Aluminum cans, other metals and glass can all be melted down and made into new products. Recycling aluminum cans uses only 5% of the energy required to make new ones.

- The oil used in the engines of cars and trucks wears out; it can be filtered and re-refined for use again. Just one gallon of used oil can be recycled into the same amount of motor oil that it takes 42 gallons of virgin oil to make.

- Lawn clippings and garden weeds can be put in a compost pile, where they are broken down by tiny organisms; the rotted result can improve your garden's soil. Yard wastes make up almost 20% of all landfill trash.

We can all contribute to solving our nation's increasing garbage problem by cutting down on the number of things we have to throw away, which will reduce the pollution caused by the production of new items and the disposal of old ones. At home and at school, you can do your part to win the war against waste by buying recycled products and by recycling products instead of throwing them away.

- **Why plant trees?** Trees provide us with wood, paper, fruit, nuts, shade, natural beauty and a buffer against noise. They also play an important role in Earth's natural cycles. Trees remove carbon dioxide, a gas, from the atmosphere and store it until they die and decompose or are burned. Since carbon dioxide is responsible for half of the gas build-up which causes the greenhouse effect, trees act as a natural control against global warming. A typical healthy tree removes between 25 and 45 pounds of carbon from the air every year. Trees also help prevent flooding and help control soil erosion. Although trees are necessary for our survival, forests are being destroyed at a rate far faster than our current efforts to replace them. In American cities, four trees are removed for every one planted.

- **Why conserve water?** Water is central to all life and life activities. Plants and animals must have water to survive. Water represents about 75% of a person's body weight and covers nearly 75% of the earth's surface. Nearly everything on earth can be directly or indirectly traced to a connection with water. Rocks channel water into streams; streams and rivers carry water across the land. Ponds, lakes, marshes and swamps often hold water in place. Trees draw water from the soil and transport it up into the leaves and out again into the air. Clouds are airborne carriers of water across the sky. People, plants, wildlife need water for survival. The water must be clean, free of toxic contamination. Humans use water for many purposes other than drinking. Care must be taken to protect water quality. Water is a source of beauty and recreation. It is the basis of a massive planetary transportation system. Water helps our food grow, cools our cars, and is one of the first things on the list of substances the astronauts take into space. There are about 320,000,000 cubic miles of water in the oceans. The tiny plants that live in the earth's oceans (phytoplankton) produce one-third or more of our oxygen, a gas vital to breathing. Conserving water saves energy and money and preserves fresh water habitat. Much energy goes into transporting water to our residences, and then more is used to heat water for bathroom and kitchen uses and still more in cleaning the water after use, for reuse by others. By conserving water it is possible to prevent some of the pollution caused by excessive energy use, such as global warming and acid rain.

- **Why conserve energy?** It is hard to imagine the world today without the use of energy. But our dependence on energy — especially that which comes from fossil fuels such as oil, coal and natural gas — is aggravating global environmental problems such as habitat destruction, acid rain, and global warming. Every time we switch on a light, turn on the heat, cook a meal, or drive in our cars, we contribute to these problems. Habitat is damaged as new energy sources are tapped. Cars and power plants pollute the air and water and contribute to the greenhouse effect. Furthermore, our supply of fossil fuels is dwindling. As energy consumption rises and energy supply falls, it will cost

us more and more to do the hundreds of things we do every day that use energy. Thus, we must all limit our energy use and find ways to use energy more efficiently. Reducing the demand for energy will reduce the need to build more power plants. Fewer power plants mean less pollution — the cheapest and least polluting power plant is the one that is never built! And, as we conserve energy to extend the use of our decreasing fossil fuel supply, we will have more time to develop cost-effective technologies for using renewable energy sources, such as solar and wind power.

Suggested Activities Across The Curriculum K-3

The following activities on the theme of pollution prevention are designed to work across the entire curriculum, so please share these suggestions with other science, English, mathematics, social studies, art, drama, music, physical education, and special education teachers. If we've left anyone out, please include them too!

Arts Activities

- Have students create an exhibit of the pollution problems by cutting pictures from magazines.
- Have students bring in photographs from magazines that show water, its uses, and how it can be polluted. Ask them to look especially for pictures that show how living things depend upon water. Display these photographs and use them as a basis for a discussion on the role water plays in our lives.
- Have students illustrate their ideas generated under the English Activities and create a class book.
- Make a paper tree on the classroom wall with each leaf giving a tip on how to protect the environment.
- Make nature cards to wish parents and friends a happy Earth Day.

English Activities

- Make a list of water words. Have students brainstorm about water words, make word trees with those words and write poetic statements about water.
- Have students list at least 100 words that have something to do with water. Ask them to think of words about water,

including its importance to people and wildlife. Keep students stretching into new areas by suggesting examples and categories of ideas if they get bogged down. Using the words that were recorded, ask the students to create word trees of water-related words. After finishing several word trees, have them look at what they have done and create poetic definitions of water or water-related concepts. These could begin: "Water . . ." or "Water is . . ." For example, using the word tree "condensation" - "cloud" - "rain" - "storm", you might get: "Water is gray clouds causing a loud summer storm." After completing their poetic statements, have them write them onto various shades of construction paper cut to graphically fit the feeling of their ideas. Arrange these cut-outs on a wall or window in an aesthetic fashion. The same process can be used to explore such concepts as "energy" or "recycling".

- Have children portray through creative dramatics such concepts as loss of wildlife due to oil spills or water pollution, stories about their favorite endangered species, or other environmental themes.
- Have students perform a play or puppet show with an environmental theme.
- Read stories with environmental themes such as *The Lorax* by Dr. Seuss, or *Charlotte's Web* and *The Trumpet of the Swan* by E. B. White (both give excellent descriptions of animal habitats), or poems such as "Sarah Cynthia Sylvia Stout Would Not Take the Garbage Out", a humorous treatment by Shel Silverstein of what happens when you don't take care of garbage. These can form the basis of discussion or motivate students in their writing assignments.

Science Activities (Trees As An Example)

- Students can participate in community tree planting activities.
- To develop long range thinking skills, pose the following situation to your students: We have six fully grown trees on our land. We have no other trees around our house or anywhere else on our land. We need firewood and are trying to decide whether to cut all the trees down during next winter to use

them for firewood. Given the information, try to decide what seems to be the best action to take. Consider: What will happen next summer when it gets hot. (No shade) What might happen the following winter when more firewood is needed to keep warm? (No fuel for cooking and heating.) What problems might there be for animals? (Fewer places for some birds and squirrels to live.) What might a person do to be sure that there are trees left for the future? (For example, each time a tree is cut two could be planted) Through the discussion, emphasize to the students the differences between the short-term and the long-term effects of actions they recommend. (Each year 2.3 billion seedlings are planted in the United States, covering 3.4 million acres. Even with that effort, the annual net loss of forest in the United States is about 900,000 acres. In tropical forests, 27 million acres are cleared for farms and other uses each year - a loss of 500,000 trees every hour of every day!)

Music Activities

- Listen to songs about nature and wildlife such as Walt Disney's *Burl Ives Animal Folk Songs* and Pete Seeger's "How Does Your Garden Grow".
- Encourage students to make up their own lyrics to popular songs.

Social Science Activities

- Have students list actions that can be taken in support of pollution prevention and decide what they will do.

Physical Education Activities:

- Have students join with other community groups to celebrate Earth Day through such recreational programs as Earth Day runs, nature hikes, bicycle races or rallies with an environmental protection theme. Such races could be held in local, state, or national parks.
- Participate in an all-school Bike to School Day for students and teachers.
- Create a dance performance in honor of the environment.

Field Trips

- Visit a dump and a recycling center to learn about two different methods of waste management.
- Visit a nature center, a natural history museum or a wilderness area.

Library Activities

Please consider having your school library participate in Earth Day activities for the period of two weeks before, and a week or so after April 22, 1990. Some things your school library can do are:

- Create displays about environmental pollution and actions that can be taken to improve our environment, using items such as: posters, newspaper clippings, and books on the environment.
- Develop reading lists of books and articles in your library on the environment.
- Develop a "reader's guide" on how to use library resources about the environment.
- Promote reading a book on an environmental theme during this time period.
- Hold discussion groups with classes of students in the library by the display (Discussion topics might include pollution prevention or any of the concepts listed below in the vocabulary section.)
- Librarians, journalism teachers, or other interested teachers and students could write a newsletter for the school reporting on student activities on Earth Day, as well as activities in the community, nation and the world.
- Librarians and teachers can invite knowledgeable scientists or persons who have written books, articles, or newspaper articles about environmental problems to speak or to make themselves available to students in the classroom, library, or assembly.

School Outreach Activities

- Urge your local park system and local business offices to have students' art displays on Earth Day, April 22, and the week after. Students could participate with other community groups such as community art classes, photography programs, after school programs, Head Start programs, and others.
- Work with your local zoos and nature centers to do a "wildlife protection" program.

- Have students contact the area library system urging a display of books, posters, and art work at all libraries in your community.

- Contact local government officials responsible for protecting and improving trees, flower beds, and other vegetation about local forestry and tree planting efforts and request them to publicize their efforts and needs during the Earth Day program.

- Encourage use of consumer power — suggest students use their money as votes for environmental betterment.

- Classes can write a letter to the local newspaper, signed by all students, urging concern about the environment and calling on the community to participate in local Earth Day activities. Seeing their names in the paper can have a lasting effect on the students and cause them to remember Earth Day 1990.

Vocabulary (Here are some selected vocabulary words associated with environmental awareness which everyone should know. You can add to this list.)

abatement	coastal zone
abiotic	community
acid precipitation	competition
adaptation	composting
advanced waste treatment	coniferous
aerobic	conservation
aerosol	decomposition
ambient	detergent
anadromous fish	detritus
anaerobic	dissolved solids
aquifer	distillation
assimilation	diversity
atmosphere	drainage basin
bacteria	dredging
benthic	dump
biodegradable	ecology
biome	ecosystem
biosphere	effluent
biota	emission
bog	endangered species
brackish water	environment
buffer zone	erosion
canopy	ethics
carbon dioxide	eutrophication
carcinogen	evapo-transpiration
carnivore	extinction
carrying capacity	finite
chlorinated hydrocarbons	food chain
climatic	fossil fuels
climax	fresh water
	fungi
	fungicide

green belts	phytoplankton
greenhouse effect	point source
groundwater	pollen
habitat	pollution
heavy metals	population
herbicide	potable water
herbivore	preservation
hydrocarbons	radiation
hydrologic cycle	reclamations
multiple use	recycling
natural selection	reservoir
niche	resource recovery
noise	runoff
nonrenewable resource	salt marsh
nuclear power plant	septic tank
nutrient	sewage
oil spill	sewer
omnivore	sludge
open space	species
organic	stagnation
organism	synergism
oxidation	thermal pollution
ozone	threatened species
particulates	toxicity
pathogenic	troposphere
percolation	understory
pesticide	urban runoff
ph	

Activities Across The Curriculum Grades 4—6

The following activities on the theme of pollution prevention are designed to work across the entire curriculum, so please share these suggestions with other science, English, mathematics, social studies, art, drama, music, physical education, and special education teachers. If we've left anyone out, please include them, too!

Arts Activities

- Organize an environmental picture contest, dramatizing the best (beauty) and worst (pollution) of nature.
- Have a poster contest on themes such as pollution prevention or endangered species. Acknowledge the winners in an all-school meeting. Display posters in public areas.
- Have students make reusable canvas grocery bags as a craft project.

English Activities

- Have an essay contest on the theme of pollution prevention or any environmental theme. Read winning

essays on the public address system or at an all-school assembly. Try to get essays printed in local papers.

- Have students write and recite poems about the environment.
- Have students write a play and read or produce it for the class on an environmental theme, focusing on a crisis that develops in a family or community because of serious pollution problems. Bring out the depth of feelings that are experienced by the loss of wildlife, open space, forests, clean air, or water.
- Read books on environmental themes such as Ray Bradbury's short story "The Green Morning" in the *Martian Chronicles*. Use this to open a discussion on air pollution and its effect on trees and human health.
- Have students give speeches to fellow students and other classes to inform them about the dangers of pollution or about any other environmental issue. Have them include requests for specific actions.
- Show movies about nature such as National Geographic specials, "Never Cry Wolf", or "Call of the Wild".

Science Activities

- Students can conduct a street or area tree inventory to determine opportunities in the community for planting new trees.
- Children in urban areas can conduct an inventory of the effects of air pollution on trees, shrubs, and especially evergreen trees. Which trees should be growing in your area that are not there now? Note pollution effects like loss of leaves, high rates of insect infestation and, on evergreens, whether or not the needles have turned brown during the growing season (spring and summer). Analyze your findings and discuss the implications for the future.
- Students can adopt a local wetland, or observe and identify the variety of wildlife there.

Music Activities

- Celebrate your appreciation of the planet by listening to classical compositions such as Beethoven's *Symphony #6 (The Pastoral)*; Richard Strauss's *An Alpine Symphony*; Ferde Grofe's *Grand Canyon Suite*; Smetana's

The Mouldau, and folksongs such as Woody Guthrie's "This Land Is Your Land" and "Roll On Columbia" and John Denver's "Rocky Mountain High". Folksingers recordings about the dangers of pollution include: Pete Seeger's "Sailing Up My Muddy Stream", Peter, Paul, and Mary's "What Have They Done with the Rain", Tom Paxton's "There Goes the Mountain", John Denver's "Whose Garden Was This?", and Malvina Reynolds's "God Bless the Grass". Contemporary rock singer Sting sings of saving the rain forests in "Don't Bungle the Jungle" and "Save the Rain Forest". Peter Gabriel sings of the dangers of acid rain in "Red Rain".

- Encourage students to sing songs about nature and, using the melodies of popular songs, write their own lyrics expressing environmental concerns. (An environmental songbook of lyrics set to popular songs has been put together by the Citizens Clearinghouse for Hazardous Waste, P.O. Box 926, Arlington, VA 22216, (703) 276-7070, \$9.95)

Social Science Activities

- Explore the terms "consumerism" and "conservation" through class discussions and written assignments.
- Have students list actions that can be taken in support of pollution prevention and have them each decide what they will be responsible for doing.
- Write to the U.S. Department of Interior, Washington, D.C. 20240, requesting any available information about threatened and endangered animals, poster-making materials, or writing materials available from state and federal agencies.

Physical Education Activities

- Have students join with other community groups to celebrate Earth Day through such recreational programs as Earth Day runs, nature hikes, bicycle races or rallies with an environmental protection theme. Such races could be held in local, state, or national parks.
- Join in a whole school system Bike to School Day for students and teachers.
- Create a dance in honor of the environment.

Classroom Discussion Plan

This panel can be reproduced for students so they can follow your discussion and questions.

YOU CAN HELP

Teach Your Friends And Family About Preventing Pollution By Your Example

Action by the President, Congress or state legislatures, rulings by the courts speeches by public leaders, or your wishing it — as important as they are cannot, by themselves, clean up the environment or keep it from becoming more polluted than it is.

Millions of people cause pollution. Many people contribute to unsightly and unsafe neighborhoods, litter on highways, schools and in our homes, but millions of people can also help plant trees, create parks, save wildlife, and improve our oceans, rivers, stream and wetlands.

You can help. You can become a very important person in this effort.

Here are some things you and your family can do: Please look at the following page titled **YOU CAN HELP**.

Selected Quotes About The Environment

"We travel together, passengers on a little space ship . . . preserved from annihilation only by the care, the work and, I will say, the love we give our fragile craft." — Adlai Stevenson

"The need is not really for more brains the need now is for a gentler, a more tolerant people than those who won for us against the ice, the tiger, and the bear." — Loren Eiseley

YOU CAN HELP

You can teach your friends and family by your example to help prevent pollution. Share this information with them.

One use is not enough. Recycle paper, glass, plastic, aluminum, scrap metal, motor oil, and yard wastes. Reuse, repair, and recycle as often as possible. Don't throw away what can be used again. Avoid creating excess garbage by using wasteful disposables. Consider using reusable mugs, glasses, dishes, cloth towels, or sponges. Save your leaves, grass, and bush clippings to use as compost. Participate in a recycling program. Encourage your community and your school to begin recycling. Maintain and repair clothes and products. Donate usable clothes and materials to thrift shops.

Use less energy. Set back your thermostat, insulate your water heater, and buy energy-efficient appliances. Setting back the thermostat not only saves money, it also saves energy. It's an investment in yourself and your environment.

Cars — Buy energy-efficient vehicles and keep them tuned. Carpool, bike, walk, or use mass transit when possible. A well-tuned internal combustion engine makes your car, boat, or tractor safer for you and the environment. Carpooling and using mass transit, biking, and walking result in less pollution being emitted. Disposal of auto waste is another significant problem: used oil can contaminate water supplies and used auto batteries contain lead, lead sulfate, and sulfuric acid which can leak into soil. Take used oil, batteries, and auto tires to a recycling center or to an appropriate disposal facility.

Apply pesticides and herbicides carefully if they must be used. Follow instructions carefully. Use natural control materials whenever possible. Pesticides and herbicides can pollute air, ground, and water and they harm beneficial insects as well as wildlife, pets, and people. If improperly applied, they can spread beyond the area in which they are applied and run into local water supplies. Purchase only

the amount needed and follow instructions carefully, minimize use, and reduce runoff with good grass cover and shrubs.

Noxious air (indoor air pollution) pollutes our homes and workplaces. Reduce tobacco smoke, radon, asbestos, and other indoor air pollutants. Americans spend more than 85% of their time indoors, so this is one of the most important areas where you can protect yourself from environmental hazards. One of the most harmful hazards is radon, a naturally occurring colorless and odorless gas that seeps into homes through cracks in foundations or floors. It is the second leading cause of lung cancer — leading to 20,000 deaths a year. Commercial testing kits are helpful if directions are followed carefully. Another indoor air pollutant, tobacco smoke, which causes problems for both smokers and nonsmokers, further increases one's chances of developing lung cancer, especially when combined with radon. Formaldehyde in new furniture and carpets, pesticides, aerosols, household cleaners, and solvents from dry-cleaning are other common indoor pollutants.

Household hazardous waste — Buy only as much potentially toxic materials or products as you need. Dispose of remnants and containers properly. Be alert to labels. Materials that are toxic to people must be labeled **Dangerous**, medium toxicity products are labeled **Warning**, and low-toxicity products are labeled **Caution**. Store such materials carefully and use them up. If you must throw them out, check your local community's policy on hazardous waste disposal. Encourage your local community to institute a hazardous waste disposal plan if one is not in effect.

Environmental shopping — Buy recycled or recyclable products. Seek out biodegradable, reusable, or returnable packages. Look for the recycling symbol on products you buy. Such symbols identify recycled or recyclable products. For home and work, buy products that are made of recycled or recyclable material. Buy durable products — don't buy throw aways. Borrow or rent things you use infrequently. Avoid buying products

which use unnecessary plastic or paper packaging. Use returnable or reusable containers. Look for pump rather than aerosol sprays. Buy rechargeable batteries for flashlights, toys, and household items. Consider carrying your own reusable shopping bag.

Lead — Be careful around surfaces covered with lead-based paint and be cautious when children are near renovation or rehabilitation of old buildings. Be concerned about lead in drinking water. Recycle auto batteries that contain lead. Older homes, especially those in poor repair or in need of painting, may contain old lead-based paint. The fine dust from deteriorating old paint and that created during renovation or rehabilitation of older buildings may contain lead particles. This dust can travel throughout the house and even outside. Keep children away from such areas. Your family might consider contacting an expert before undertaking such renovations.

EPA has found unhealthy contaminants in drinking water in some areas. Because lead and other contaminants may cause a health problem, consider having your water tested if your house has lead pipes. Two drinking water precautions are to run water until it changes temperature — and use only the cold-water tap for drinking and cooking, especially for making baby formula. Lead can slow children's physical and nervous system development and cause other neurological, reproductive, and circulatory problems. Auto batteries contain lead and should be recycled or disposed of at appropriate disposal sites to help reduce the amount of lead in the environment.

Plant trees, shrubs, and indoor plants. They replenish the earth's oxygen supply and provide habitat for wildlife. Plant trees or bushes in your yard or neighborhood. Trees in your yard may save you money in heating and cooling. They beautify your property and increase its value, and provide habitat for wildlife.