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A Position Paper of Environmental Education for Nelson County

Geneva B. Hunt

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A POSITION PAPER OF
ENVIRONMENTAL EDUCATION FOR NELSON COUNTY

A Project
Presented to
the Faculty of the Department of Counselor Education
Western Kentucky University
Bowling Green, Kentucky

In Partial Fulfillment
of the Requirements for the
Education Specialist Degree

by
Geneva B. Hunt
August 1974
A POSITION PAPER OF
ENVIRONMENTAL EDUCATION FOR NELSON COUNTY

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A POSITION PAPER
OF
ENVIRONMENTAL EDUCATION FOR NELSON COUNTY

Geneva B. Hunt
July 1974
160 pages

Directed by: Doctors Emmett Burkeen, Kirk Dansereau and Karl Kreisler
Department of Counselor Education Western Kentucky University

The results of a survey, concerning environmental education taken of the educators of the Nelson County School System, indicated a need for environmental education workshops and classes.

The status of environmental education in the nation and in Kentucky were studied and compared. A research was done of the status of environmental education in Nelson County, and implications were drawn for implementing environmental education in the Nelson County School System.

A tentative program for implementing environmental education in the Nelson County schools was given, and a bibliography of resources and materials to be used in said program was included.
ACKNOWLEDGEMENTS

The writer desires to acknowledge with sincere appreciation the assistance given her during the preparation of the study by the members of her special committee—Dr. Emmett D. Furkeen, Chairman and director of the study, Dr. Kirk Dansereau, Mr. James McKee, and Dr. Karl Kreisler. She is also indebted to all the educators of the Nelson County School System whose responses to the survey inventory became the basis of the study. She also wishes to acknowledge the assistance given by Dr. Henry Hardin, librarian director of Western Kentucky University; Dr. N. A. Shepard, Research Department; Dr. James W. Grimm, Department of Sociology and Anthropology; Glenn Hodges, State Consultant for Environmental Education; and her typist, Miss Susie Smith.

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Finally, the writer wishes to express her sincere appreciation to her father, Kelly Buckman, and to her children: Dennie, Tommy, Genny and Judy, for their patience and understanding during the research and preparation of this study.
To my graduate advisor, James McKee, for his patience, advice, understanding, and encouragement, I dedicate this thesis.
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CHAPTER I

Introduction

Background of Study

For the past two decades there has been a gradual awakening of the public to the importance of the environment. In this fast-moving decade of the seventies, when virtually every organization--political, social, educational, or commercial--has been demanding environmental improvement, a critical need has arisen. Stimulating action no longer seems to be of highest importance; instead, the task is to analyze who is doing what and how, so that all interested people can share and study in order to advance the common cause.

In no area is the need greater than in education where national, state, county and local groups, official and unofficial, are taking up the battle to attack environmental evils. Only education can liberate man from these evils. The crux of the matter is self-learning skill--for he who knows how to bring about change in himself and society by positive means will tend to do so; after all, it gives him the greatest reward.

Of prime importance for successful teaching of environmental education are the teacher's attitudes. One cannot develop in others attitudes that are not possessed by one's
self. A reorientation of the teaching staff toward man, his environmental problems, and the future is the primary need if programs of environmental education are to be implemented.

Concern for the environment is of prime importance. A teacher's knowledge of curriculum materials is as vital to a young person's growth and development as a doctor's knowledge of the latest medicines and equipment is to a patient's health. Yet many of today's colleges and universities are insulated from environmental inquiry and new ideas. They are neglecting the needs of family, farmers, sportsmen, rural America, and consumers in general.

Education, as the means of developing knowledgeable citizens of the future, has a responsibility to teach students of today what they will need to function in the world of tomorrow. Yesterday's mistakes and today's problems will not disappear until people become aware of them and willing to work toward their solution. Education must carry a large share of the responsibility to foster this awareness and to motivate the people for action.

**Statement of the Problem**

The central problem in this investigation is to assess the attitudes of public school educators in the Nelson County School System toward the need for integrating environmental education into all phases of the curriculum. In addition, this study will seek to provide answers to the following questions:
1. What is status quo of environmental education in the nation?
2. What is status quo of environmental education in Kentucky?
3. What comparison can be drawn between the nation's and Kentucky's provisions for environmental education?
4. What is the status quo of environmental education in Nelson County?

Objectives of This Study

1. To determine the attitudes of educators in Nelson County, Kentucky, toward integrating environmental education into all phases of the curriculum.
2. To ascertain the status quo of environmental education in the nation.
3. To ascertain the status quo of environmental education in Kentucky.
4. To compare the national environmental education program with that of Kentucky.
5. To ascertain the status quo of environmental education in the Nelson County School System.
6. To determine what implications exist for implementing environmental education into all phases of the curriculum of the Nelson County School System.
7. To propose a tentative program for implementing environmental education into the Nelson County School System.

8. To compile a bibliography of materials for use in teaching environmental education in Grades I through XII in the Nelson County School System.

Significance of the Study

In studying this problem the researcher has found that current or existing attitudes and knowledge concerning environmental education could be improved by a variety of experiences. Some suggestions would be classes, and by acquiring a good bibliography of existing materials that could be added to school libraries and classrooms. Knowledge acquired for teaching environmental education will have a great value for the school system and/or the community. A better understanding of the county's problem and ways of helping to solve it could be learned in these classes and passed on to others to help in its solution. If this study proves to be successful, it will add greatly to the researcher's professional development. The researcher will feel more confidence in the future to meet and find solutions to other felt problems.

Definition of Terms

For purpose of classification in the use of specific terminologies, the following terms will be defined:

1. Attitudes refer to the particular beliefs,
feelings, and response tendencies that are present whenever an individual is confronted by the appropriate object.

2. Environmental education is teaching and learning about everything that exists outside one's self and the influence of these things upon one's inner-self.

3. Public school educators refer to all of the teachers, librarians, counselors, principals, assistant principals, supervisors, personnel workers, coordinators, and the superintendent of Nelson County.

Limitations of the Study

1. This study is limited to the attitudes of all the educators of the Nelson County School System concerning the need for integrating environmental education into all phases of the curriculum.

2. It is further limited to the training for teachers and curriculum specialists needed for integrating environmental education into the Nelson County School System.

3. This study is still further limited to the ways community resources of Nelson County could be used most effectively in integrating environmental education into the school system of said
4. It is also limited by the kinds of materials that will be most effective in presenting environmental education in Nelson County.
CHAPTER II

The Status of Environmental Education in the Nation

This chapter is designed to present how important the nation considers environmental education—its background, the bill passed, offices and centers established, current opinions of some of the national educations concerning it, what the present holds, and what it presents for the future. As these affect our state's and county's environmental education programs, they must be presented, studied and evaluated.

Though the term ecology was coined a century ago to refer to the relationships between organisms and their environments, both living and non-living, only in the very recent past has it become commonplace in serious discussions of the human condition.

In the decade of the thirties conservation became the key word. Conservation of land, water, and trees was carried on in many states of the union. Trees were being replanted; farmers were taught to rotate crops and to plant on contour; and new dams and lakes were built to conserve the water. Stricter laws were put into effect for the preservation of wildlife that was fast becoming extinct.
During the forties, educators and other decision-makers became more widely concerned with the topic of conservation of the environment—protection and use of forests, soils, minerals, water, and wildlife. Teaching of such was to be included in the curriculum of public schools.

Although the debut of environmental education has been slow, its full recognition appeared in the late sixties and is being even more forceful in these fast-moving seventies.

We need new knowledge, new perceptions, new attitudes. . . . We seek nothing less than a basic reform in the way our society looks at problems and makes decisions. . . . It is also vital that our entire society develop a new understanding and a new awareness of man's relation to his environment—what might be called 'environmental literacy.' This will require the development and teaching of environmental concepts at every point in the education process.

Thus Nixon spoke to Congress in 1970, reflecting the widespread public concern about environmental issues. Two months later he signed into law the Environmental Education Act. This landmark legislation established an Office of Environmental Education within the Office of Education that was directed to encourage and support the development of educational resources required to meet the environmental education needs of all age groups and all sectors of the country.

Having begun its work by supporting a wide spectrum of activities to test the full range of environmental education and resources around the country, the Office of Environmental Education has provided about five million dollars in assist-
This initial experimentation and investigation has enabled the Office of Environmental Education to acquire a deeper foundation of knowledge about the strengths, weaknesses, gaps, and characteristics of environmental activities throughout the United States.

A widely used method of teaching environmental education, the Strand approach, is advocated by the National Parks System in its National Environmental Study Area program. This method weaves strands of environmental information through regular subjects and incorporates environmental experiences and encounters with the inquiry method to create an integrated education program. The National Parks System believes that the Strand approach will lead students to a good understanding of the uses and abuses of their environment.

Throughout these United States are many and sundry environmental centers and methods of teaching environmental education, but educators and other leaders have agreed that the inter-disciplinary and multi-phase programs are the most effective. Whatever method is used, the facilities for environmental education can be classified into a pattern of concentric circles. The school building and site are in the center circle; the community surrounding the school in the next circle, and the distant community and natural sites are in the outer circle (The Environmental Education/Facility Resource, 1973). The Office of Environmental Education in many instances has either helped or totally provided for
facilities used. Near many schools have been built environmental sites. The school sites generally help only those schools of which they form a part. These sites provide facilities that are limited only by the boundaries of one's imagination, resourcefulness, and enthusiasm.

In most of the states environmental centers have been established. These centers have brought yearly thousands of students and teachers and provide not only educational experiences but will also provide settings for the training of personnel in environmental education. Some of these centers are privately owned, as the Kalamazoo Nature Center for environmental Education (Kalamazoo, Michigan), which began its varied program of research, conservation, and education in 1961. The center consists of an interpretive center, hundreds of acres of natural areas, farmland and trails, an arboretum, a day camp, barnyard, and exhibits. It serves over 10,000 children and adults each year from the areas around Kalamazoo and gives college credit courses for teachers and students in association with some of the region's colleges (Environmental Education/Facility Resources, 1973).

The Fernbank Science Center, a division of the DeKalb County School System in Georgia, is an outstanding regional center for science and environmental education. A combination of public, private, and government funds were joined to develop a forest, a planetarium, an electron microscope, a meteorological laboratory, a library, and many supporting services and exhibit areas. Fernbank's program and facilities
to environmental study.

Because Title I and Title II funds are increasingly more difficult to obtain, school boards frequently seek other partners in initiating resident programs in environmental education. Partners can be found in government agencies (National Park Service, United States Forest Service), colleges, youth agencies (Boy Scouts, Girl Scouts, YMCA, YWCA, Boy's Clubs), quasi-public national agencies (Red Cross, Salvation Army), and private agencies and foundations.

The Freemont Environmental Education Center of Maryville College at Townsend, Tennessee, the site of a National Education Association--National Parks Service workshop, provides a model for cooperative programs between private colleges, the National Park Service, and local school districts. The center serves 25 public school systems within a 200-mile radius; about 150 pupils per week live at the site. When not in use by school groups, it is used on the weekends for seminars and church groups.

The National Parks System has resident facilities and cooperates in resident programs with local school systems at the Cape Cod National Seashore, at Catoctin Mountain Park in Frederick County, Maryland, and at the Whiskeytown National Recreation Area in California. These programs use the National Educational Development program of National Park Service.

The Tacoma, Washington School District #10 operates a 31-week outdoor resident program, which serves over 3,000
students a year in three camps. One camp is state-owned, one is owned by the YMCA, and one by the Salvation Army.

The bay, the dunes, the sunken forest, and the ocean at the Fire Island National Seashore in New York are used by students of New York City's School District #14 as educational resources and facilities during one-week resident experiences. Park rangers using materials from the National Environmental Education Development Program assist school teachers as on-site instructors.

The Lorado Taft Field Campus, the outdoor education center of Northern Illinois University in Oregon, Illinois, serves as a resident center for schools, colleges, and community groups in the region. The center is staffed by professionals from the university.

The Goddard Youth Camp is a beautifully appointed facility on 160 acres in the National Arbuckle Recreation Area in Oklahoma. The camp is owned by the Charles B. Goddard Foundation, which leases the land from the National Parks System. Goddard provides week-long programs of environmental education for five Texas and Oklahoma school districts and a dozen colleges. In addition to serving the immediate region, Goddard offers resident programs for groups from as far away as Los Angeles, San Francisco, and Memphis.

A different kind of resident center is operated by the Kenai Peninsula Borough School District in Soldotna, Alaska. On 40 acres of land made available on the Kenai National Moose Range by the United States Department of Fish and
Wildlife, sixth grade pupils live and study in tents in rather pristine surroundings. Since none of the facilities are heated at this site, students and teachers use the campfire as their center for learning about environmental ethics, decisions, contamination, and quality. The enthusiasm of the pupils supports the contention that any appropriate space can be developed quite simply and effectively into an important facility for environmental education.

Pittsburg operates a cooperative resident program in outdoor and environmental education by leasing a YMCA camp for a three-day resident program for sixth graders. About 2,000 youngsters are served each school year. Another YMCA facility, Camp Sloane in Lakeville, Connecticut, is used throughout the school year by many students for their resident program in environmental education.

This researcher has named only a few of the resident programs throughout the nation, but these give an indication of the wide variety of cooperative efforts around the country. Many more programs of equal merit are in operation.

**Review of Literature**

This section consists of a review of literature which is relevant to this study. Also, research will be reviewed pertaining to the attitudes of educators concerning environmental education, the training for teachers and curriculum specialists needed for integrating environmental education into the curriculum, the ways community resources could
be used most effectively in integrating environmental education into the curriculum, and the materials that would be most effective in presenting environmental education.

An Overview of Current Research or Sources of Information

Beverly Jensen (1972) pointed out that ecology ideas really hit home when field trips were planned close to school.

In examining the work of Thomas J. Rillo, Harrison (1971) reported the following comments by Rillo:

Environmental education is not a happy field. Each and every discipline taught to teachers of all grades is a vehicle for teaching environmental education.

In addition Harrison, himself said:

If environmental education does not become inter-disciplinary and universally taught, we might all become the victims of the abuse, misuse, and misunderstanding of the environment.

Donald Stotler (1971) viewed environmental education as a liberation of mankind from the malfunction caused by disease, the malnutrition caused by starvation, the maltreatment caused by injustice, and the maladjustment caused by poor self-learning skills. He further stated that if change is impossible, revolution is inevitable.

Alexander (1972) quoted Ian Marceau concerning pollution problems and the myth that no individual citizen today can do anything about them:

If it doesn't stop, the very thing that attracted people here originally will have been destroyed. The golden goose will have died from fouling its nest and drinking polluted water.
Frank Graham, Jr. (1972) said:

Each person has a vital role to play in the struggle to save our earth. There is strength in the flow of ecology-oriented information that can be taught. In this way, people who are best able to correct the problems at their source will be moved.

Environmental education, viewed by Beverly Jensen (1972), begins as close to the child as the air he breathes. He thought that in initiating environmental education, the teacher should start close by. Then, after the children understand what their immediate environment is, the teacher sends them out to report on what needs changing. He decided that the reading of the local newspaper should be a part of the environmental studies. This is to look for local developments, population growth and its problems, proposed transportation and disposal systems, restrictions on industries, and planning zoning in the city and county.

George T. O’Hearn (1972) said:

Environmental education is a prerequisite for achieving scientific literacy. It is one of the essentials for public understanding of the difference between the short- and long-term benefits that science and technology are constantly offering in the name of progress. At present, much of our school curriculum is a study of what takes place in history, in science, and in social studies. But this is past, and our students are living in the present and rushing toward the future. This means that not a day should go by in the classroom without projecting the future role of the students via the content that is being considered.

Attitudes of Educators Toward Environmental Education

Several educators have representative views toward
environmental education. These are:

Michael Frome (1972):

Teachers' attitudes toward teaching of the environment being a part of science will have to change. Every educator--principal, teacher, and curriculum specialist--must be made aware that every discipline is a vehicle of learning about the environment.

Don Morrison, National Education President 1971-72:

Education's role is critical. We must provide the leadership in developing an aware and enlightened citizenry equipped with a basic understanding of environmental problems, and a basic motivation and desire to act upon them.

Jim Roady, President 1971-72 Association of Classroom Teachers National Education Association:

Education must become the number one priority of the world. It is no longer enough to understand the past or even the present. Man must learn to anticipate direction and change; and teachers must help students acquire knowledge, ethical standards, and life styles which recognize man's personal responsibility to quality environment.

Donald Stotler, Science Supervisor of Portland Public Schools, Oregon (1971):

It seems likely within ten years the curriculum fabric at all levels will be largely woven from the woof of resources and the warp of population; for the fittest organism is not necessarily the one that is becoming dominant the fastest. The organisms most fit to survive are apparently those most nearly organized for reorganization in terms of problems as they arise. This kind of adaptability human society does not now have, but could be developed.
Training Teachers and Curriculum Specialists on the Environmental Education Concerns

Representative statements concerning the training of teachers and curriculum specialists on environmental education concerns were made by the following:

George T. O'Hearn (1972):

In order to implement programs of environmental education, the primary need is a reorientation of the teaching staff toward man, his environmental problems, and the future. Workshops or summer school courses, which may be conducted in part of a university, must be tied to the community, to the students, and to the society in which the teacher will function.

Michael Froome (1972), regarding training for teachers:

College courses and workshops should not only be analyzing specific current problems, but training those fortunate enough to be students so they in turn can train others. I don't mean only in the readily apparent environmental sciences, but in all subjects; for all disciplines will be needed to safeguard the environment.

The Utilization of Community Resources

George T. O'Hearn (1972):

Environmental education requires that individuals from the community--urban leaders and representatives of municipalities and industries--be brought into the schools in an instructional capacity, not to supplant teachers but to supplement what is going on in the classroom. Environmental education assumes that the students can get out into the community and take a critical look at what is happening. It is an honest approach to the problems of a changing society and an acknowledgement that environmental education is community oriented.
Marshall E. Parks (1973):

Environmentally oriented citizens' groups are an educational resource that should be more seriously considered by K-12 educators. In the United States literally thousands of energetic and talented citizens are involved in organizational efforts that are guided by goals and objectives similar to those frequently espoused by professional environmental educators.

Beverly Jensen (1972):

After your students begin to awaken to their surroundings and some information is gathered, take more in-depth field trips to observe plant and animal life. Try to keep the groups small--no more than a one-to-ten teacher/ratio. If you need help, ask for assistance from high school students who are interested in ecology, from students' parents or through a community volunteer center. Using such sources of aid also gives you the opportunity to create school-community interaction.

Materials That Can be Used Most Effectively in Presenting Environmental Education

Sayre and Olsen (1971):

A proliferation of environmental material is being produced for use in the schools. Films, filmstrips, filmloops, workbooks, lesson books, textbooks, books of environmental nursery rhymes, toys, and games are appearing on the market.

The Environmental Education/Facility Resource (1973) pointed out:

The facilities and materials for environmental education can be classified into a pattern of concentric circles. The school building and school site are in the center circle; the community surrounding the school in the next circle, and the distant community and natural sites are in the outer circles.
Donald Stotler (1971) said:

A wide variety of curriculum materials and resources is needed at all levels of instruction. Every conceivable media for instruction should be used to their best advantage to instruct, supplement, reinforce, and motivate students in achieving objectives.

Samples of materials are: films, audiotapes, transparencies, periodicals, filmstrips, speakers, film slides, pictures, charts, models, television, radio, dramatics, special publications, newspapers, and laboratory experiences.

The rapid emergence of environmental education as an interdisciplinary subject has evolved through an interesting series of events in which national, political, and economic practices paralleled the attention given to the subject by the educational community.

First came the dramatic stories of the endangered species of trees and wildlife. Then attention turned to the threat to the existence of man himself. This was followed by the enactment of emergency legislation, much of which was ill-conceived and poorly regulated. Ecological activism abounded while long-range legislation was developed to improve the quality of the nation's environment. The crisis gave birth to a whole new ecological-industrial complex in American society. Accompanying these events were the efforts of the education community to introduce valid and educationally sound methods which would succeed in educating a whole generation of youth to an acceptable environmental ethic.

Education appeared to be the one constant interlaced through every program aimed at improving the environment.
Where other programs dropped by the wayside, education gained momentum as an important vehicle in the environmental struggle.

School programs of environmental education now exist at every level, and they appear to be proliferating. The body of knowledge about environmental education has grown to include curriculum, methodology, resources, and new facilities.

**Summary**

This chapter has presented the status of environmental education in the United States. It has emphasized what has been done and is being done toward educating our youth to conserve for future generations.
CHAPTER III

The Status of Environmental Education in Kentucky

The purpose of this chapter is a presentation of the status of environmental education in Kentucky, some of the present effective aids available for teaching environmental education, and a comparison of Kentucky's and the nation's environmental education programs.

The importance of the environment has been officially recognized in Kentucky, by educators and by other decision-makers, since 1944. Kentucky Revised Statute 153.280, enacted 1944, deals directly with the topic of the environment. It states that:

Instruction in all phases of conservation and preservation shall be included in the curriculum of the public schools of Kentucky; and textbooks, regarding the proper use and protection of forests, soils, water, minerals and wildlife shall be prepared or selected by the State Textbook Commission for this purpose.

Thus, Kentucky joined in the National movement toward conservation education.

In the early 50's, an identifiable emphasis on "outdoor education" emerged. The basic principle of this era was that the out-of-doors was often a classroom superior to the traditional four walls and a chalkboard. Later, in the 60's, a term which had traditionally been used only in the bio-
logical sciences evolved into common usage. This term was "ecology." Technically, ecology is "a branch of science concerned with the interrelationship of organisms and their environment." Signs, sweatshirts, bumper stickers, and the mass media all declared the arrival of the ecology movement on Earth Day, April 22, 1970 (Office of Curriculum Development, Kentucky Department of Education).

From this brief historical overview, it is not difficult to understand why many people appear to be confused when confronted with still another educational term, "environmental education." It is understandable that many would think what is now called for is an annex to the science curriculum or the addition of a new subject in the curriculum. Environmental education is neither. It uses many of the ideas and methods of the conservation educators and outdoor educators and often deals with the science of ecology; yet, it is much broader and requires interaction with all other disciplines.

Throughout many of the school systems in Kentucky, environmental education programs are in varied stages of development or implementation. These vary from the study of commercial material to extensive use of residential site facilities. There is a great demand for additional knowledge and materials in the area of environmental education, however; the major problems confronting many of the school systems are hesitation to proceed due to an overcrowded curriculum, lack of funding for materials, lack of teacher experience with environmental education, or a combination of these.
At the present time there are four environmental resident centers in Kentucky. The Union College Environmental Education Center at the former Cumberland Gap Job Corps Center is operated under a special use permit from National Park Services. Located in Middlesboro, Kentucky, in the Cumberland National Historic Park, the center operates year-round as a site for week-long resident programs for Cumberland area schools in three states. The 100-acre campus provides excellent facilities for programs for five classes a week. The center is also used for campus retreats, a center for graduate and undergraduate studies in related fields, and for environmental workshops.

The Regional Center for Environmental Education at Golden Pond, Kentucky, is a heavily used resource in the Tennessee Valley Authority's Land Between the Lakes area. It is so popular that school districts from Kentucky, Tennessee, Indiana, Illinois, and Missouri wait for vacancies. Day and resident facilities are available with program and maintenance staffs to assist. The Paducah, Kentucky schools, for example, with 75 teachers trained in environmental education and using 50 junior and senior high school students as teaching aids, use Land Between the Lakes for a fifth and eighth graders' resident program.

Pine Mountain Environmental Center is located in the Pine Mountain State Park. It is a residence center and provides excellent facilities for environmental programs. Eastern Kentucky University offers graduate and undergrad-
uate credit courses and workshops there and provides environmental directors and assistants for the teachers who take their students there.

Within three miles of Bardstown, Kentucky, a new environmental education center opened in June, 1973. King's Center, situated on the former Nazareth College campus, is comprised of 1000 acres of land—woodland, meadow, farm buildings and animals, shrubbery, lakes, and ponds. It offers residence for four hundred and will have a staff of environmentalists to guide the teachers with their students. Excellent laboratory equipment and library facilities are also available. College credit courses will be offered to teachers in association with some of the region's colleges.

Within her boundaries, Kentucky has forty state and national parks that offer superb day visits for the students. As Kentucky has all types of land, soil, and rock formations, so do these parks cover a wide range of differences in environments that have a wide variety of plant and animal life to be studied.

A comprehensive, effective program of environmental education cannot be established without knowledge of numerous environmental aids—people, bureaus, centers, groups, agencies, universities, and material. A listing of these various aids for utilization in teaching environmental education in Kentucky follows.
STATE ENVIRONMENTAL EDUCATION CONTACT:

Mr. Lynn Hodges  
State Consultant for Environmental Education  
Department of Education  
Capitol Plaza Towers  
Frankfort, Kentucky 40601  
(502) 564-3505

SCHOOL PROGRAMS AND ACTIVITIES:

Environmental and Outdoor Education  
Mr. James M. Major  
Paducah Public Schools  
1000 Clark Street  
Paducah, Kentucky 42001

School Site Development  
Mr. Harold Grooms  
Bourbon County School System  
Paris, Kentucky 40361

Murray’s Environmental Education Laboratory  
Murray Independent School System  
Fred Schultz, Superintendent  
Murray, Kentucky 42071

Curriculum Integration in Environmental Education  
McCracken County School System  
Dr. David S. Stewart, Superintendent  
Paducah, Kentucky 42001

Environmental Education within Model City  
Bowling Green Independent School System  
Dr. James B. Graham, Superintendent  
Bowling Green, Kentucky 42101

Curriculum Development and Community Utilization  
Henderson Independent School System  
William E. Posey, Superintendent  
Henderson, Kentucky 42420

Curriculum Development and School Site Development  
Hardin County School System  
Dr. Ernie Thro, Director  
Elizabethtown, Kentucky 42701

Community Resource Utilization  
Elizabethtown Independent School System  
William A. Sadler, Superintendent  
Elizabethtown, Kentucky 42701
Inner City Environmental Education
Watsen Lane Elementary
Jefferson County School System
Mr. Randall Pelfry, Principal
Louisville, Kentucky 40213

Fayette County Environmental Education Program
Fayette County School System
Mrs. Mary Strong, Supervisor
Lexington, Kentucky 40503

Rural Environmental Education
Owen County Elementary School, O. V. Hones, Superintendent
Owen County School System
Owenton, Kentucky 40359

Project PEACE (Environmental Education and Early Childhood Ed.)
Title III, ESEA Region V
Ray Nuffett, Coordinator (11 county area)
Tradewind Center
Somerset, Kentucky 42501

Project for Environmental Awareness
Title III, ESEA Region VI
Shaw Blankenship, Coordinator (13 county area)
601 Beagley Building
Eastern Kentucky University
Richmond, Kentucky 40475

L.B.J. Environmental Education Program
L.B.J. Elementary School
Francis Johnson, Principal
Jackson, Kentucky 41339

Tennessee Valley Authority's Land Between the Lakes Environmental Education Center
John Paulk, Educational Director
P.O. Box 27
Golden Pond, Kentucky 42231

Union College Environmental Education Center
Dr. Ed Baker, Director
Cumberland Gap National Park
Middlesboro, Kentucky 40965

Pine Mountain Settlement School
Environmental Education Center
Peter Westover, Director
Pine Mountain, Kentucky 40864

Louisville Environmental Education Program
Louisville Independent School System
David Shulhafer, Coordinator
Louisville Board of Education
Fourth and Broadway
Louisville, Kentucky 40202
UNIVERSITY AND COLLEGE PROGRAMS AND ACTIVITIES:

Union College
Training and Site Development in Environmental Education
Barbourville, Kentucky 40906
Dale Myers, Director

Prestonsburg Community College
Robert Allen, Coordinator
Prestonsburg, Kentucky 41653

Somerset Community College
James Anderson, Coordinator
Somerset, Kentucky 42501

Thomas More College
Bill Bryant, Coordinator
Covington, Kentucky 41017

Kentucky Wesleyan College
Dr. Lee A. Dew, Coordinator
Owensboro, Kentucky 42301

Spalding College
Sister Mary Gemma, Coordinator
Louisville, Kentucky 40203

Hopkinsville Community College
Charlie Irvin, Coordinator
Hopkinsville, Kentucky 42240

Elizabethtown Community College
George L. Luster, Coordinator
Elizabethtown, Kentucky 42701

Lexington Technical Institute
Russell E. Puckett, Coordinator
Lexington, Kentucky 40503

Paducah Community College
John E.L. Robertson, Coordinator
Paducah, Kentucky 42001

Jefferson Community College
William B. Turner, Coordinator
Louisville, Kentucky 40201

Ashland Community College
Libby Callihan Walthall, Coordinator
Ashland, Kentucky 41101

St. Catherine College
John S. Wright, Coordinator
St. Catherine, Kentucky 40061
Murray State University  
Don Hunter, Coordinator  
Murray, Kentucky 42071

Western Kentucky State University  
Chuck Crume, Coordinator  
Bowling Green, Kentucky 42101

University of Louisville  
Kirom C. Bordoloi, Coordinator  
Louisville, Kentucky 40202

Kentucky State University  
Dr. Gerritt Kloek, Coordinator  
Frankfort, Kentucky 40601

University of Kentucky  
Dr. Roger Barbour, Coordinator  
Lexington, Kentucky 40503

Eastern Kentucky State University  
Dr. Glenn O. Carey, Coordinator  
Richmond, Kentucky 40962

**COLLEGES AND UNIVERSITIES FUNDED UNDER ENVIRONMENTAL ED. ACT:**

Morehead State University  
Dr. Jerry F. Howell, Coordinator  
Morehead, Kentucky 40351  
(Funded under E.E. Act FY 1971, FY 1972)

Bellarmine College  
Charles E. Kupchella, Coordinator  
2000 Norris Place  
Louisville, Kentucky 40205  
(Funded under E.E. Act FY 1972)
GROUPS AND AGENCIES WITH INTEREST IN ENVIRONMENTAL EDUCATION

Bernheim Forest Nature Center
Pen Armstrong, Coordinator
Bernheim Forest
Clermont, Kentucky

State Department of Health
Irvin Bell, Assistant Director
275 E. Main Street
Frankfort, Kentucky 40601

State Department of Natural Resources
Bill Gayle, Coordinator
Capitol Plaza Towers
Frankfort, Kentucky 40601

State Department of Fish and Wildlife
James Gilpin, Coordinator of Conservation Education
Capitol Plaza Towers
Frankfort, Kentucky 40601

Soil Conservation Service
Harvey D. Bradley, State Conservationist
Lexington, Kentucky 40504

Mrs. Ruth Fishback
Buckley Hills Audubon Society
Versailles, Kentucky 40383

Title I ESEA
Mr. John Bruce, Director
Capitol Plaza Towers
Frankfort, Kentucky 40601

Louisville Audubon Society
Mrs. Barry Jacobs, Executive Secretary
3616 Windward Way
Louisville, Kentucky 40220

State Department of Commerce
John Stapleton, Coordinator of Research and Planning
Capitol Plaza Towers
Frankfort, Kentucky 40601

Army Corp of Engineers
Tom Sweet, Coordinator
Louisville, Kentucky 40202

Kentucky League of Sportsmen & National Wildlife Federation
William Smith, Coordinator
Owensboro, Kentucky 42301
Rt. 6
Title III ESEA
John Bruce, Coordinator
Capitol Plaza Towers
Frankfort, Kentucky  40601

State Department of Parks
Bill Marshall, Coordinator
Capitol Plaza Towers
Frankfort, Kentucky  40601

Agriculture Experimental Station
Joe B. Williams, Coordinator
University of Kentucky
Lexington, Kentucky  40504

Save Our Kentucky
Mr. James Branscome
P.O. Box 795
Louisville, Kentucky  40201

Mammoth Cave National Park
Len McKenzie, Chief Naturalist
Mammoth Cave, Kentucky  42259

Mt. People's Rights
Prestonburg, Kentucky  41653

Kentuckiana Girl Scout Council
Mary Jo Leppert, Field Director
1268 Cherokee Road
Louisville, Kentucky  40204

Kentucky Program Development Office
Margaret LeBus, Representative
Capitol Plaza Towers
Frankfort, Kentucky  40601

Kentucky Forestry Council
Dr. Thomas Hansbrough, Coordinator
University of Kentucky
Department of Forestry
Lexington, Kentucky  40506

Kentucky Tuberculosis and Respiratory Disease Association
Joseph M. Higdon, Western Kentucky Regional Director
P.O. Box 137
322 West 5th Street
Owensboro, Kentucky  42301

Future Homemakers of America (student group)
Mrs. Agnes Foster, Advisor
Capitol Plaza Towers
Frankfort, Kentucky  40601
Future Farmers of America (student group)
Mr. James M. Everett, Advisor
Fulton County High School
Hickman, Kentucky 42050

Cumberland Chapter of the Sierra Club
Mr. Carroll Tichenor, Chairman
Cave Run Farm
Nicholasville, Kentucky 40356

Kentucky Academy of Science
Dr. Marvin Russell, President
Ogden College of Science and Technology
Western Kentucky University
Bowling Green, Kentucky 42101

Kentucky Congress of Parents and Teachers
Mrs. W. Glenn Keightley, 1st Vice-President
4405 Church Street
Covington, Kentucky 41015

Bluegrass Organic Association
Mary Ann Cateforis, Coordinator
984 Maywic Drive
Lexington, Kentucky 40504

Citizen's Metropolitan Planning Council, Inc.
P.O. Box 175
Louisville, Kentucky 40201

Kentucky Association of Conservation Districts
Mr. Robert Ellis, President
709 Florence Pike
Burlington, Kentucky 41005

Daniel Boone National Forest
Mr. Joe Clark, Coordinator
Winchester, Kentucky 40391

Kentucky Education Association
Gerald Jaggers, Coordinator
101 West Walnut Street
Louisville, Kentucky 40202

Appalachian Hardwood Association
Howard D. Bennett, Executive Vice-President
1414 Walnut Street
Cincinnati, Ohio 45202

Courier Journal and Times
525 West Broadway
Louisville, Kentucky 40202
Paducah Sun Democrat
Pat Moynahan, Coordinator
Kentucky Avenue
Paducah, Kentucky 42001

Kentucky Department of Environmental Protection
Thomas Harris, Director
Capitol Plaza Towers
Frankfort, Kentucky 40601

Kentucky Department of Highways
Darrell Baker, Coordinator
Capitol Office Building
Frankfort, Kentucky 40601

Tennessee Valley Authority
Golden Pond Office
John Paulk, Coordinator
Golden Pond, Kentucky 42231

Coca-Cola Bottling Company
Craig R. Schmidt, Coordinator
Louisville, Kentucky 40202
RESOURCE MATERIALS AVAILABLE

Experimental curriculum material:

Kentucky Department of Education
Paducah Public Schools
Bourbon County Public Schools
McCracken County Public Schools
Henderson Public Schools
Harmon County School System
Jefferson County, Watson Lane Elementary
Project PEECE, Title III, ESEA Region V
Union College Environmental Education Center
Pine Mountain Settlement School

General Resource Material

Morehead State University
T.V.A./Land Between the Lakes-Residential facilities
Department of Health-Solid Wastes, Housing, Regulations
Department of Commerce-Regulations, Economics, Trade impact
Army Corp of Engineers-Technical impact of construction
Buckley Hills Audubon Society-Audubon publications, day use facilities
Department of Fish and Wildlife-monthly publications, resource guides
Department of Natural Resources-brochure items of conservation
University of Kentucky
Mammoth Cave National Park-NESA and NEED material
Kentucky Tuberculosis and Respiratory Disease Association-several brochures and one (1) book dealing with air, health, and pollution
Cumberland Chapter of Sierra Club-Sierra Club publications
Appalachian Hardwood Association-films, strips, kits, and samples relating to forestry management and use
Courier Journal-regular news articles, special reports on ecology
Paducah Sun Democrat-regular articles, reports on Environmental Education in Western Kentucky area
Kentucky Department of Highways-impact statements in brochure form
Coca-Cola Bottling Company-Ecology kit X013-environmental games
POSSIBLE RESOURCE PEOPLE:

Wendell Berry
Department of English
University of Kentucky
Lexington, Kentucky 40503

"Probably one of the most articulate organic farmers around." (Rodale's March 27, 1970). He still lives on 13 acres not too far from the University of Kentucky. He hopes to find "renegade professors" in agricultural colleges. For a beautifully developed expression of one man's attitude toward the land, read his *The Long-Legged House* published in paper-back by Audubon/Ballatine.

Wayne Davis
Professor, School of Biological Sciences
University of Kentucky
Lexington, Kentucky 40503


Dr. Roger Barbour
School of Biological Sciences
University of Kentucky
Lexington, Kentucky 40503

Has written several books on ecological habitats and wildlife in Kentucky.

Mr. James M. Major
1000 Clark Street
Paducah Board of Education
Paducah, Kentucky 42001

Coordinator of one of Kentucky's outstanding Environmental Education programs. Developed curriculum guide, *Objectives and Field Activities in Environmental Education*, consisting of teacher developed curriculum materials, multidisciplinary.

Mr. Harold Grooms
Director of Environmental Education
Bourbon County Board of Education
Paris, Kentucky 40361

Developed and coordinated curriculum for school site development adjacent to high school and junior high school.
Mr. J.A. Prestridge, Director
Institute for Environmental Studies
University of Kentucky
Lexington, Kentucky 40506

Mr. Orville Stewart
Water Pollution Control Board
Frankfort, Kentucky 40601

Mr. Joseph Higdon, Director
Western Region, Kentucky Tuberculosis and Respiratory Disease Association
P.O. Box 137
322 West 5th Street
Owensboro, Kentucky 42301

Special presentation concerning air, health, and pollution. Brochure material available in large orders for study and use by school systems.

Dr. Jerry F. Howell, Coordinator
Environmental Education
Morehead State University
Morehead, Kentucky 40351


(List compiled by Department of Environmental Education, Frankfort, Kentucky, 1973).

From this listing of programs, activities, and of groups and agencies with interest in environmental education, a conclusion can be drawn concerning Kentucky's present and possible future for Environmental Education.

Kentucky has certainly made headway since environmental education was first started nationwide. Considering how many federal grants were given throughout the nation, Kentucky has received very few (three to be exact). Whether other states presented better programs to be funded, or
whether the National Education Bureau thinks Kentucky does not need the money certainly offers room for some deep thought on the matter. Whatever it is, Kentucky is striving to offer her students all she can afford in environmental education.

In Somerset, Kentucky, a curriculum development program has been at work on model curricula units in a sequenced format. These will serve as a pattern after which teachers may develop their own curriculum, and a practical guide for classroom use. This should further aid teachers in a better interdisciplinary program.

Several states have had environmental education for years. One of the oldest continuously operating resident programs is conducted by the Los Angeles City Schools at its Clear Creek Camp in the San Gabriel Mountains. The city has worked in cooperation with the United States Forest Service for 45 years to run this year-round facility which served almost 10,000 Los Angeles school children in 1972.

Outdoor education resident programs were started many years ago in pioneering projects such as Battle Creek, Michigan, and Newton, Massachusetts. Early leaders, including L.B. Sharp and Julian Smith, paved the way for subsequent developments. Many early programs have been in continuous operation and contributed significantly to environmental thinking through their focus on outdoor education.

As other states had earlier beginnings, they are more advanced than Kentucky in environmental education. This
does not mean she intends to remain idle and not work toward getting programs started. Many are underway; others are being implemented; still more are being planned.

Union College, Barbourville, Kentucky, has developed a comprehensive environmental education program for undergraduate and graduate students. An interdisciplinary approach is used. A two-year program for environmental technicians is also under construction. As teachers receive the training, the work will move faster toward a better and more comprehensive program.

Rome wasn't built in a day nor is a truly adequate environmental education program going to mushroom over night. It will take time, money, effort, and know-how. More than all of these, the right attitudes will produce the willingness and determination to carry the program through.

Chapter IV has the purpose of presenting the status of environmental education in Nelson County, the implications for implementing environmental education in the Nelson County School System, and a tentative program for teaching environmental education in the Nelson County System.
CHAPTER IV

Status of Local Environmental Education

Since 1944, when Kentucky enacted Revised Statute 158.280 concerning the teaching of the environment—conservation and preservation—it has been taught, but as units of the science curriculum. One unit has been taught in English, but this was because of a yearly essay contest sponsored by the Louisville Courier Journal and Times.

Environmental education as advocated by the National Environmental Education Association and by Kentucky's Department of Education has not been taught in the Nelson County School System. Environmental education has never been integrated into all phases of the curriculum.

In Nelson County, as elsewhere, students are able to observe what is happening to their environment, but they do not realize why and how it will affect their future and that of their descendants. Along the highways and byways, in the brooks, creeks, lakes, and rivers of Nelson County are scattered or piled papers, bottles, cans, or pieces of cars, and even discarded household furnishings. Atop many of the hills, to get good drainage, are perched stock or dairy barns, from which drainage is added to the drinking water of much of the county's rural population. From the factories
and distilleries, the smoke stacks' output blackens the skies, and their wastes are added to the streams. Rubbish heaps furnish homes for rodents which spread disease and add further to the already accumulated wastes.

Students have been getting some environmental instruction in some units of science in which some teachers use the school sites for teaching and experiences. All schools of the Nelson County System have sites which could be used for environmental education. Nelson County Senior High is developing an environmental education site behind the school. It has a lake and a fish pond; and different trees, shrubs, and flowers to attract birds are being set-out and planted.

At the present time, plans are being made to integrate environmental education into all phases of the curriculum. A study is being made of all available facilities and resources and of necessary training for faculty members.

One school of the system, New Haven Junior High, took its students to Pine Mountain Environmental Center this year. This is the first such trip, and this school's teachers will share with the other teachers their experiences and thoughts concerning their residence and classes there.

The writer composed an attitude inventory which was given to all the educators of the Nelson County School System (See appendix I). Over 62% answered the inventory. Of this number from 65% to 75% replied in favor of statements concerning the integration of environmental education into all phases of the curriculum and that it should not be a
self-contained course; that it should not be a concern only of science teachers; that all facilities of the school, school site, and community--individuals from the community and all available resources--should be utilized most effec-

tively; and that field trips should be taken.

Over 75% agreed that at least one or two in-service days should be devoted to environmental workshops for teachers. A workshop or university credit course, offered partly in the classroom and partly in the community where teachers will function, was felt by 30% to be needed and should be asked for in the county.

Materials are being ordered for the school libraries, so an adequate supply will be available. These may not cover all available environments, but it will be a workable amount, and others will be added yearly.

One cannot say that nothing has been done or is being done in environmental education in the Nelson County School System, but the future looks brighter than either the past or present.

**Implications for Implementing Environmental Education in the Nelson County School System**

With the results of the Attitude Inventory being so favorable, it seems that Nelson County School System is ready for the integration of environmental education into the cur-

riculum.
In March, 1973, a clean-up drive of the county was sponsored by the local radio station. This drive, with students from the three local high schools participating, was received favorably by the people of the community.

A group of educators and community leaders met at Nazareth, Kentucky in May, 1973 to discuss the opening of a new environmental center. In June, 1973 the new center, King's Environmental Education Center, was established. Glenn Hodges, State Consultant for Environmental Education, is now working to help implement the program. It has over 1000 acres and has residence for four hundred. It has ponds, lakes, wooded areas, shrubs, farm animals, barns, a dairy, birds, and many other facilities available to help the teachers, would-be leaders, and trained environmental specialists. Courses affiliated with colleges will be offered with credit for participating teachers.

Old Kentucky Home State Park and Bernheim Forests are located in Nelson County. Lakes, creeks, and a river provide available water supply. With these facilities come plentiful wildlife, both land and water, to be added to the available resources.

Throughout Nelson County is a variety of soils and land areas: from knob lands to river bottoms, from race-horse farms to general or dairy farms, from rocky formations to silt soils or even clay, from cave areas to plains. Yes, in Nelson County are found many varieties of facilities and resources.
Attitudes of some of the teachers need to be reoriented concerning the needs of Nelson County youngsters and of the community. This could be accomplished by a good environmental education workshop or college course.

Interest for environmental education was shown in the meeting concerning the new center and in the Attitude Inventory. Facilities are available; students and community need environmental education. Why wait?

A Tentative Program for Implementing Environmental Education in the Nelson County School System

When a school staff and the community it serves agree to the high priority status of environmental education, they are ready to begin studying alternatives and planning for the program. Most schools begin with three steps.

First is the utilization of the school plant as a study site. Close examination of the schools' facilities, by students, will result in the development of many environmental concepts. Specific areas of the school will be identified as areas of good or poor environmental use. Basic logistics of maintenance, food preparation, and waste disposal are all potential sources of environmental study. The studies of school regulations yield a surprisingly high number which are closely related to environmental concerns. Examination of architecture and classroom design is another avenue to environmental awareness. By examination and evaluation of the school site, indoors and outdoors, students will be prompted
to follow through with environmental projects designed to correct problems and to maintain and promote areas which illustrate good environmental practices. These activities are not limited to any one course of study but are multidisciplinary, that is, applicable to many subject areas.

After the utilization of the existing school plant as an environmental study site, the second step is often expansion into the school community. Commonly seen areas develop a new significance and importance as students begin to examine them from an environmental point of view. Environmental abuses are identified and analyzed; possible solutions to problems are formulated and discussed; action is proposed and taken. Students experience either success or set-backs in solving the problems and learn valuable lessons either way. They become active members of the community, meeting with community leaders and discussing mutual concerns. Education begins to become a "living with" experience, rather than simply a "living about" experience. Individual and community actions are either criticized or justified on the basis of environmental concepts. Concurrent with the environmental program, basic concepts of the various discipline areas are taught. English, math, social studies, science, and the fine arts become useful and relevant in the common cause. The school, students, and community become linked in a useful, realistic chain of life.

Building upon the foundations and concepts established in the school plant and community, Nelson County schools
could take a third step and expand their environmental studies program and their residential site facility. Typically, classes of students are taken to a contrasting environmental site for three to five days. New discoveries are made, concepts verified, new skills developed; and positive environmental attitudes are reinforced. Students and teachers, by living together, begin to develop new images of themselves and of each other. Regular school subjects take on new importance in their relationships to environmental experiences at the site facility. Common experiences become the reference point for teachers and students when they return to the regular classroom. Contrasts and comparisons are made through direct experience rather than from abstract lectures and readings. Eventually, abstractions which are learned are greatly strengthened and supported by the concrete experience of the students. In turn, the total curriculum is enhanced and integrated around a common learning center.

If this program is effectively utilized an awareness of the immediate surrounding should be instilled in Grade I through III; how the environment is affected by the individual should be understood by Grades IV through VI; Grades VII through IX should be able to identify areas of environmental problems; and Grades X through XII should not only have the ability to recognize present and future problems but also should have the ability to formulate and implement solutions to these problems.
For an effective and comprehensive environmental education program, the utilization of a variety of aids is needed. These aids, according to type and grade usage, have been listed in Appendix II.
CHAPTER V

Purpose, Findings, Summary, Conclusions and Recommendations

The purposes of this study, as earlier stated in Chapter I, were:

1. To determine the attitudes of educators in Nelson County, Kentucky, toward integrating environmental education into all phases of the curriculum.

2. To ascertain the status quo of environmental education in the nation.

3. To ascertain the status quo of environmental education in Kentucky.

4. To compare the national environmental education program with that of Kentucky.

5. To ascertain the status quo of environmental education in Nelson County.

6. To determine what implications exist for implementing environmental education into all phases of the curriculum of the Nelson County School System.

7. To propose a tentative program for implementing environmental education into the Nelson County School System.

8. To compile a bibliography of materials for use in teaching environmental education in Grades 1 through
XII in the Nelson County School System.

Through the research done and as a result of the 'Attitude Inventory' given to the educators of the Nelson County School System, conclusions were made concerning the readiness of the citizens, students, and educators of Nelson County for the implementation of programs for the teaching of environmental education in the Nelson County School System. The Attitude Inventory showed over 65% of the educators felt a need for, and were willing to teach environmental education. They are ready and in need of such programs being implemented into the system. Some orientation for some of the educators will have to take place. With an Environmental Center in the County offering training courses from affiliated colleges, and with workshops and available community resources, much can and will be done.

With the existence of a tentative program for environmental education, an all-around abundance of local resources, and a bibliography of materials—many already purchased—an effective program for the Nelson County School System should be possible.

Environmental education is meant to improve the quality of life by making students aware of the world around them and motivating them to work toward making it a better world. If this is to happen, then education's role is critical. Educators' attitudes toward the teaching that the environment is to be considered in science courses and only in science courses will have to change. Educators will have to be
made aware that every discipline is a vehicle of learning about the environment and that all disciplines will have to be integrated to form the whole.

Environmental education requires facilities on a different scale from other subjects. In environmental education, the meaning of facilities widens to include all the places where students' education takes place, as well as the things that facilitate learning. These facilities can be urban or rural, man-made or natural, public or private, and sophisticated or primitive. The teacher must learn to mine the treasures of places and things existing in national parks, in schools, and in communities around them and use them for effective programs in environmental education.

The use of community facilities for environmental education is moving the educational programs out into the community. It puts students into the real world where rich resources of people, places, and processes can be tapped for educational purposes. This trend is in part a response to the issue of relevancy in education, in part it's economic, and in part it's a means of broadening the educational opportunities that have been restricted by the four walls of the schoolhouse and the people it contains.

Although the students may be familiar with the community facilities, they can take on a new life when visited and analyzed for an environmental learning program. Accessible community resources include the water-works, power plant, garbage dump, building excavations, sewage disposal, parks,
swamp areas, seashores, commercial businesses, manufacturing plants, museums, and government offices.

George L. O’Hearn (1972) said:

In order to implement programs of environmental education, the primary need is a re-orientation of the teaching staff toward man, his environmental problems, and the future. Workshops or summer school courses, which may be conducted in part of a university, must be tied to the community, to the students, and to the society in which the teacher will function.

These workshops and classes must not be only analyzing specific current problems by environmental science, but must be held in all subjects; for all disciplines will be needed to safeguard the environment, for now and the future. One cannot teach what he does not know, nor in others can he build attitudes which he does not possess himself. With every discipline serving as a vehicle for teaching environmental education, maybe some of our present environment can be saved and the rest can be improved.
APPENDIX I

Environmental Education: Attitude Inventory

1. You are: (please check appropriate box) ☑ male ☐ female

2. Your age group: (please check appropriate box)
   ☐ 25 or below ☐ 36-45 ☐ 56-65  
   ☐ 26-35 ☐ 46-55 ☐ over 65

3. Your level of instruction in the Nelson County public school is: (please check appropriate box)
   ☑ elementary ☐ secondary

4. If not teaching, your main responsibility is that of a: (please check appropriate box)
   ☑ counselor ☑ coordinator ☐ principal
   ☑ librarian ☑ assistant principal ☐ superintendent

5. Your highest degree held is the: (please check appropriate box)
   ☑ Bachelor's ☑ Rank I
   ☑ Master's

6. Your total years of teaching and/or administrative experience is: (please check appropriate box)
   ☑ less than 2 ☐ 6-8 ☐ 21 or more
   ☑ 3-5 ☐ 9-10
   ☑ 11-15 ☐ 16-20

DIRECTIONS: This scale has been prepared so that you can indicate how you feel about integrating environmental education into the school curriculum. Please circle the letters on the left how you feel about each statement. (SA=strongly agree, A=agree, D=disagree, SD=strongly disagree)

1. SA-A-D-SD. Only science teachers should handle the teaching of environmental education.

2. SA-A-D-SD. Environmental education curriculum is primarily limited to outdoor activities.
APPENDIX II

Bibliography of Materials for Use in Teaching Environmental Education, Grades I Through XII, in the Nelson County School System

Grades I Through III

The overall objective for the teaching of environmental education in grades one through three is to create an awareness of the immediate environment. This is a bibliography of materials (books for students, books for teachers) filmstrips, graphics, magazines, and addresses to help with a worthwhile program in all phases of the curriculum.
BOOKS

Grade 1 - Grade 3


In pictures of deceptive simplicity, optical illusions from structures in which curious little men can go upstairs to get a lower place, hang pictures on the ceiling, and walk on walls. How would the room look if you could walk on the ceiling? See Environmental Geometry cited in Curriculum section.

Related book: A Very Special House by Ruth Krauss


Written in words easily understood by children, this introduction to ecology begins with the child and where he lives in the city and progresses to the communities of plants and animals. See also books cited under Busch & Howell.


A small city child operates in positive and successful ways to preserve the big pile of dirt left by a steam shovel in the local park.

Related books: Allen, Marjorie Planning for Play


An easy-to-read text combined with excellent illustrations by Jeanne Bendick make it possible to recognize the meadow's inhabitants and to understand why they are so well suited to their environment.


Animals' homes are compared to the homes of people in a tale woven of fantasy and realism.

Related books: Fisher, Aileen Best Little House


The concept of city growth is presented at picture book level in this story. It shows how neighborhoods change and what happens as cities grow and devour more and more open space.

Related books: Coleman, Hilda Peter's Brownstone House


Puddles and Ponds describes a pond community. It is a part of a series, Discovering Nature, whose purpose is to present the elements of ecology and to help the young child to experience his environment aesthetically as well as intellectually.
Have this colorfully illustrated volume available as a ready reference as children study the environment and the place of "me" in relation to all its aspects.

The Childcraft Annual, 1971 ABOUT ANIMALS is filled with exciting pictures and is an excellent source of accurate information.

A book about shapes that helps children see triangles, circles, squares, and rectangles in an infinite number of objects in nature.

Elkin, Benjamin. LOUDEST NOISE IN THE WORLD. Hale, 1954.
A picture story of a small boy's birthday wish with a surprise ending. James Daugherty's vigorous illustrations are wonderfully "noisy". Could well be used before going on a "listening walk" or when introducing noise pollution.

A book about shapes that helps children see triangles, circles, squares, and rectangles in an infinite number of objects in nature.

A book about shapes that helps children see triangles, circles, squares, and rectangles in an infinite number of objects in nature.

A book about shapes that helps children see triangles, circles, squares, and rectangles in an infinite number of objects in nature.

A book about shapes that helps children see triangles, circles, squares, and rectangles in an infinite number of objects in nature.

A book about shapes that helps children see triangles, circles, squares, and rectangles in an infinite number of objects in nature.

Aileen Fisher's love of nature comes bursting out of this collection of her poems. By seeing ordinary things in new ways she jolts her reader humorously into doing the same.

Aileen Fisher's love of nature comes bursting out of this collection of her poems. By seeing ordinary things in new ways she jolts her reader humorously into doing the same.

Aileen Fisher's love of nature comes bursting out of this collection of her poems. By seeing ordinary things in new ways she jolts her reader humorously into doing the same.

Aileen Fisher's love of nature comes bursting out of this collection of her poems. By seeing ordinary things in new ways she jolts her reader humorously into doing the same.

The author and artist capture the child's wonder of the world around him: the sunrise and sunset, shadows that change from large to small, the clouds that hide the sun.

The author and artist capture the child's wonder of the world around him: the sunrise and sunset, shadows that change from large to small, the clouds that hide the sun.

The author and artist capture the child's wonder of the world around him: the sunrise and sunset, shadows that change from large to small, the clouds that hide the sun.

The author and artist capture the child's wonder of the world around him: the sunrise and sunset, shadows that change from large to small, the clouds that hide the sun.

Hoban, Tana SHAPES AND THINGS Macmillan, 1970
Everyday objects shown as white solids against black introduce children to the beauty of form. See also the author's book Look Again as another way to develop visual perception.

Hoban, Tana SHAPES AND THINGS Macmillan, 1970
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Hoban, Tana SHAPES AND THINGS Macmillan, 1970
Everyday objects shown as white solids against black introduce children to the beauty of form. See also the author's book Look Again as another way to develop visual perception.
In this traditional folksong, a little city boy has a small patch of grass in which a tiny tree with a tiny nest grows. Fun to dramatize and make up new verses.
For another song that's fun to sing, in a most colorful book, see Over in The Meadow by John Langstaff — animals and counting. Fun for Everybody, by Wrenn, shows what a natural experience song making is for young children.
Behnke, Frances WHAT WE FIND WHEN WE LOOK UNDER ROCKS
Kirn, Ann LETS LOOK AT TRACKS
Waters, John P. NEIGHBORHOOD PUDDLE

Howell, Ruth Res EVERYTHING CHANGES Atheneum, 1969
Text and photographs describe the changes accompanying the seasons throughout the year. The book develops the idea of continuity as well as change.
Related books: Behn, Harry ALL KINDS OF TIME
Polgreen, John SUNLIGHT AND SHADOW

Jacobs, Leland B. IS SOMEBEHE ALW AYS FAR AWAY? Holt, 1967
it is difficult for children to understand time and place; this book of poems takes that difficulty into account.

A small boy's ecstatic enjoyment of snow in the city.
This is only one of many picture books that can be used to reinforce and extend the small child's natural curiosity and delight in his environment. The following list is intended only as a beginning. You will find many more.

Brown, Margarete Wise WAIT TILL THE MOON IS FULL Harper 1943
Carrick, Carol SWAMP SPRING Macmillan 1969
Ets, Varil Hall PLAY WITH ME Viking Press 1955
Fre. Perince THE OLD HULLFROG Scribners 1968
Garelick, Way WHERE DOES THE BUTTERFLY GO WHEN IT RAINS Scott 1961
Grossbort, Francine A BIG CITY Harper 1966
Krauss, Ruth HAPPY DAY Harper, Row 1949
McCloskey, Robert MAKE WAY FOR DUCKLINGS Viking 1941
McCloskey, Robert TIME OF WONDERS Viking 1941
Selsam, Millicent YOU AND THE WORLD AROUND YOU Double-
day 1963
Tresselt, Alvin WAKE UP CITY Lothrop 1957
Tresselt, Alvin WHITE SNOW, BRIGHT SNOW Lothrop 1956
Udry, Janice TREE IS NICE Harper 1956

Kipling, Rudyard THE ELEPHANT'S CHILD Follett, 1969
Picture book format, alive with the greens, blacks, and browns of Africa. Set each child on the crack of a discovery to satisfy his "satable curiosity" and then start his own collection of "Just So" stories — pictorial, verbal or written.
Pictures and simple text describe a small boy who observed the growing of the grass, flowers, and chickens, but did not realize that he had also grown until he tried on his last year's clothes.
Related books: Childcraft, Vol 14 ABOUT ME
Krasilovsky, Phyllis THE VERY LITTLE BOY
McCloskey, Robert ONE MORNING IN MAINE
Myler, Rolf HOW BIG IS A FOOT
Selsam, Millicent WHEN AN ANIMAL GROWS

The author's usual light-hearted style drives home the message of how "Droppers", "Wreckers", and "Spoilers" mess up the environment and what can be done about it.
Related books: Bendick, Jeanne A PLACE TO LIVE
Orlowsky, Wallace WHO WILL WAS THE RIVER

Three ideal communities - a village, a town, and a city, are skillfully described and visualized in this picture book. Follow up with children's own ideas of an "ideal" community. All kinds of possibilities for art projects and mapping.

Related book: Wolff, Janet LET'S IMAGINE SOUNDS.

Clever imagery and word play in verses heightened by Leonard Weisgard's illustrations. Lends itself to art and language arts as natural history.

Helps children learn that geography, climate, and resources determine kinds of houses in which people live.
Related books: Burns, William A. A WORLD FULL OF HOMES
Carter, Catherine TRUE BOOK OF HOUSES
Hawkinson, John LITTLE BOY WHO LIVES UP HIGH

Relates the parent's past, family generations and family tree to show how people's living habits change with time.
Related book: Lawson, Robert THEY WERE STRONG AND GOOD
BOOKS FOR TEACHERS
Grade 1 - Grade 3 (activity grades)

Comstock, Anna B. HANDBOOK OF NATURE STUDY. Cornell
A classic among general nature activity books, written by an elementary school teacher for teachers. Nature activities, for indoors and outdoors, described in detail. Drawbacks in that interrelationships are not emphasized but does contain materials that cannot be found elsewhere - e.g., domestic animals.

Coleman, Statis N. ANOTHER DANCING TIME. Day, 1957
Simple scores to accompany the earliest "play dancing" done by small children. Pieces are about birds, frogs, balls, merry-go-rounds. Easy to go from here to "dancing" the wind, autumn leaves, a growing plant.

Hag, John W. & Phyllis J. Wilson. CURRICULUM ENRICHMENT OUTDOORS. Harper & Row, 1965
More than 350 suggestions for outdoor activities to enrich every area of the curriculum. A listing of activities by grade level (1-9) is a useful addition. Currently out-of-print but certainly worth pursuing in libraries.

Linderman, Earl W. DEVELOPING ARTISTIC & PERCEPTUAL AWARENESS. William C. Brown, 1964
A concise well-illustrated book, with emphasis on the preschool and elementary levels. It contains good coverage of the whole area of motivation and offers specific examples for the beginner.

Morse, Jim & Nance Matthews. THE SIERRA CLUB SURVIVAL SONGBOOK. Sierra Club, 1971.
A wide sampling of the best environmental songs in America today. The lyrics and music for guitar are included. Certainly a must for all school libraries. Current musical selections can be used to introduce many aspects of environmental problems.

Playing games is one more excellent means of developing environmental awareness. This book offers many suggestions that will enliven all aspects of the curriculum. Bring it to the attention of your gym teacher too.

Myers, R. E. & E. P. Torrance. CAN YOU IMAGINE? Ginn, 1965
A wonderfully rich source of imaginative ideas to encourage children to think creatively and critically.

New ideas for practical art lessons for the elementary school using these sixty easy-to-follow, imaginative lesson plans you can recycle all manner of materials from home and yard.
Ritcher, Evelyn et al. HELPING YOUNG CHILDREN LEARN. Merrill, 1966.

This book's emphasis is on experimentation, self-direction, appreciation and awareness, as well as the implementation of appropriate skill learnings. Contains a wealth of practical suggestions.

Subarsky, Zachariah et al. LIVING THINGS IN FIELD AND CLASSROOM. Minnesota School Work & Science Center University of Minnesota, 1969.

A handbook for teachers of elementary grades to help them give children firsthand experiences with living things and to coordinate outdoor teaching with the indoor curriculum.


A sensory approach to ecological involvement that can be used at any grade level. Suggestions for activities and techniques for control in an outdoor situation.
Buchsbaum, Ralph & Mildred. BASIC ECOLOGY. Boxwood, 1957.  
As the title indicates, a basic introduction to ecology for beginners in the field. Useful bibliography that includes journals and textbooks as well as titles under special aspects of ecology.

Farb, Peter and Editors of Life. ECOLOGY. Silver Burdette, 1963.  
Excellent introduction to the ecology covering all aspects of plant-animal-man relationships. Final chapter deals briefly with historic attitudes toward ecological concepts and current awareness of need for conservation measures. Many full-page illustrations throughout make this useful for browsing for all age groups. A map and descriptive notes of the major biomes of the world appear at the end of the text. Also, a bibliography with classified entries. The other volumes in this Life Nature Library are a valuable addition to any classroom.  
OUR LIVING WORLD OF NATURE. McGraw-Hill, is another excellent series.

Professor Metcalf states in his introduction that this year book is difficult - "It is a book that will have to be read and reread, and it can't be understood except as its readers try out ideas in some kind of instructional context".

Explains in simple language and with great clarity the complex term "Balance of Nature".

Terry, Mark. TEACHING FOR SURVIVAL. Ballantine, 1971.  
"Those who are in a position to teach and to lead others to learn and act, can hardly find a better guide to environmental action than this richly detailed discussion..."
CURRICULUM MATERIALS
Grade 1 - Grade 3

A guide to the use of the urban environment as an instructional median. Package includes a general guide to urban environmental education; 4 packets of activity cards - one for each of the grade levels K-3, 4-6, 7-9, 10-12, and a guide to the natural history of cities.

Teaching suggestions to help children grasp the concept of change and continuity. Useful in conjunction with unit on Color and Change cited in this section. This is only one of many units in the Minne Mast Project for grades K-3 which are applicable to environmental education.

COLOR AND CHANGE Environmental Science Center, Minnesota.
Children become aware of color as an important property of natural materials and color change as a significant indicator of biological alteration of these materials. Suggested activities for all seasons.
This is one of several useful units available from the Environmental Science Center. Request an annotated list of their publications.

A social studies and science curriculum for Grade 1, 2, & 3, developed by teachers, that offers a wide variety of classroom experiments, suggestions for field trips and supplemental activities from which the teacher might choose. Environmental concepts, as they relate to the experiences of the children, are well-thought out and successfully incorporated. There are two particularly interesting sections - "Comparison of Food and Health Practices of Indians, Early Settlers and People Today" and "Conservation Practices of Indians, Early Settlers and People Today". See also the March, 1972 issue of Science and Children.

A British paperback handbook for elementary school teachers outlining techniques and suggesting activities with interdisciplinary, environmental emphases.

Attractive well-thought out booklet. Useful in explaining objectives of environmental education to parents of Grades K-6.

A sampling of programs which social studies teachers will find provocative. Detailed comments on projects for elementary and secondary levels followed by a bibliography.


An "experience first" approach to ecology with a rich variety of suggestions for explorations and activities stressing the interrelationships in nature. A story concludes each topic. Excellent bibliographic references are listed for each experience.

MAINE ENVIRONMENTAL EDUCATION PROJECT Dean Bennett, Coordinator.

A theme environment has been chosen for each grade level, "Within the theme environment, students will be encouraged to interact with the environment or utilize resources in interesting ways and, in so doing, they will become aware of, or guided in, the identification of past, present, or pending environmental problems".

MAN AND HIS ENVIRONMENT: AN INTRODUCTION TO USING ENVIRONMENTAL STUDY AREAS Association of Classroom Teachers, NEA 1970.

A new interdisciplinary approach to environmental education at all school levels. It provides practical suggestions for classroom teachers for use of the environment to help students understand relationships between man and his environment. A unique aspect of this approach is the utilization of five "strands" which can be applied to any subject area. A filmstrip also entitled Man and His Environment will orient administrators, teachers and the public to this strand approach.

MAN AND HIS ENVIRONMENT Coca Cola Company

This is a kit distributed by Coca Cola consisting of two simulation games - Make Your Own World and Mars I - Spacecraft. The latter is best suited to the lower elementary grades. The Spaceship earth concept is illustrated as children work to get the two crews back to earth after one ship crashes, using the limited food, air, space and water.

NUFFIELD JUNIOR SCIENCE PROJECT Wm. Collins Sons, 1967.

The Nuffield Junior Science Project is a large scale British experiment in education, in which young children were introduced to the excitement of practical investigation and scientific observation. Teacher's Guide 1 sets out the general educational thinking of the Project. Teachers Guide 2 presents thirty-eight live cases.
The introduction emphasizes the need for environmental and conservation education, and advocates an inquiry approach. Outdoor resources available to every school are listed. Detailed suggestions are made for investigations, references are cited and student activities are suggested.


An interdisciplinary approach that includes mathematics, science and social studies. The materials need are simple, inexpensive, readily available and familiar. The activities offer a positive approach to the study of pollution.

WHAT'S IN YOUR ROOM? National Audubon Society.

This is a flannel board story about the source of things we use everyday -- furniture from trees, wool from sheep, etc. Full size patterns for the cut-outs are included. Children can readily make up their own flannel board stories to illustrate their environmental investigations.

DISCOVERING LIFE AROUND US Encyclopedia Brittanica. silent color.

Shows relationship between living things and introduces some ecological concepts. Size relationships in film are not true and some vocabulary will need explaining. Can be used to introduce discussion of familiar areas or as a prelude to a field trip. Series titles: A Visit to the Farm; A Visit to the Garden; A Visit to the Pond; A Visit to the Seashore; A Visit to the Woods.

LET'S READ AND FIND OUT Thomas Y. Crowell Company, Sound, color.

These sound filmstrips are based on the successful Let's Read and Find Out series of books written by such well-known authors as Rose Farnes, Judy Hawes, and Paul Showers. Some of the titles - Follow Your Nose, My Five Senses, Ducks Don't Get Wet, Birds Eat and Eat and Eat. Having the books available will reinforce the filmstrips.

SIGHT AND SOUND DISCOVERY TRIPS Sound, color, Eyegate.

A series of enjoyable listening experiences including Sounds of the City, Sounds by the Sea, Sounds at the Zoo. Eyegate House has a unique evaluation book "Quickstrips" printed directly from the filmstrip, they provide a simple, quick, accurate and free method to preview.

WHERE DOES THE BUTTERFLY GO WHEN IT RAINS? Mary Cerele, Weston Woods, color, silent or sound.

The text is built on speculation and partial answer, leaving the viewer with a multitude of other questions as well as a real desire to find out just where the butterfly does go. The illustrations convey the atmosphere. This is one of the many Weston Woods filmstrips that are faithful
adaptations of the finest picture books, including Caldecott Medal winners. A picture-cued booklet containing the story is provided with each filmstrip. For the sound filmstrip a related phonograph record features an expert story teller.

GRAPHICS
Grade 1 - Grade 3

ECOLOGY WHY'S Carnegie Museum
Two sets, of six charts each, on heavy cardboard 20" x 24". Charts cover such subjects as Animal Homes in Trees, Soil - How It Is Made, What Good Are Trees, Succession on a Fallen Log. Accompanying teacher's manuals contain a lesson plan, follow-up activities, a glossary and reading list.

This poster series was designed for use by teachers and pupils of elementary grades. The teacher's guide provides background information and suggested activities for each poster. Another series, similar in format, is entitled Eco-Problems.

LIFE EDUCATIONAL REPRINTS Life Education Program
The editors of Life have reprinted many of the pictorial essays for use in schools. The series from the World We Live In is an excellent source of pictures for ecological studies at any grade level.

NATIONAL WILDLIFE WEEK National Wildlife Federation
An annual event in March which focuses attention on different aspects of wildlife each year. Kits, which include posters and suggested activities, are available to teachers free of charge.

STUDY PRINTS Producer - S.V.E.
18" x 13" photographs on heavy stock in sets of 3. On the reverse of each print is factual information, questions, and suggestions for use. The Basic Science Series covers plants, animals, cloud forms, and land forms of running water. Urban Life Series introduces the child to some of the ways the people of the city work and play. Most of the prints can be adapted to use through Grade 6.
MAGAZINES
Grade 1 - Grade 3

AUDUBON National Audubon Society, 950 Third Avenue, New York, N.Y. 10026. $10.00 with individual membership in Society. Bi-monthly, 130 pages, noted for its excellence of materials and color photography. A wonderful source for a picture file.

THE CONSERVATIONIST State of New York, Dept. of Environmental Conservation, Albany, N.Y. 12201. $2.00 per year subscription, $5.00 for three years. Bi-monthly, contents include students' page and How-to-do-it series. This is probably the best magazine from a State "Conservation" Department. A Teacher's Packet is available containing a series of colorful pictures and teaching suggestions.


THE JOURNAL OF ENVIRONMENTAL EDUCATION Dembar Educational Research Services, Box 1605, Madison, Wisconsin 53701. $7.50 subscription, $5.00 for students, $2.00 single copy. Quarterly, 48 pages, black and white, no photographs. Vital addition to professional libraries in every school.

KIDS Kid's Publishers, Inc., 777 Third Avenue, New York, N.Y. 10017. $5.00 per year subscription, 50¢ each. "The magazine by kids for each other;" poems, stories, cartoons, photos, paintings and more. 10 issues per year, 50 pages.


NATIONAL WILDLIFE National Wildlife Federation, 1412 16th Street, N.W., Washington, D.C. 20036. $6.50 per year with Associate Membership. Bi-monthly, 55 pages, noted for many color photographs. There are Environmental Education materials available, also a kit for National Wildlife Week. "Ideas for Learning" a teacher's guide to National Wildlife is now being published. NWF also publishes International Wildlife, similar in format and with "Ideas for Learning" guide free to teachers.

PACK-O-FUN John M. Clapper, 14 Main St., Parkridge, Ill. 60069. $5.00 per year ($10.00 for 3 years) Monthly. Arts and crafts projects with holiday and/or seasonal emphasis. A wealth of ideas for recycling all manner of materials.
RANGER RICK'S NATURE MAGAZINE  National Wildlife Federation, 1414 16th St., N.W., Washington, D.C. 20036. $6.00 per year. Monthly (except) June and September. For young people, 45 pages, many color photographs. Vital addition to the school library. Teacher's guide available.

SCHOOL ARTS  72 Printer Building, Worcester, Mass. 01608. $7.00 per year. Monthly September-June. The art magazine for teachers with new ideas, latest techniques and practical help. Articles and activities to increase students' environmental awareness.

SCIENCE AND CHILDREN  National Science Teachers Assn., 1201 16th St., N.W., Washington, D.C. 20036. $4.00 per year subscription, 75¢ single copy. Published September-December and February-May, 30 pages black and white. Many valuable teaching suggestions.

THE WHEWISH TREE  American Indian Historical Society, 1451 Masonic Avenue, San Francisco, California 94117. $6.50 per year, six issues. Written, illustrated and produced by an all Indian organization. Stories, games, artwork, articles about Indian culture and more.
Environmental education is concerned with the nature of man, the nature of the biosphere in which we live, and the interrelationships that exist between man and biosphere.

In a day and age when the results of human arrogance, that sets man outside of the beautifully interrelated systems of nature, are violently apparent in the form of pollution, overpopulation, with its many resultant strifes, environmental degradation and over-exploitation of limited resources, it is imperative that people become educated to the point of a basic environmental literacy. It is a task for the total educational curriculum. Teachers and interpreters at every level will have to do their part.

In grades four to six, children are pulling together many previous experiences and blending them with new ones in the formation of basic concepts and conceptual schemes. Emphasis can be placed on helping the youngsters analyze their experiences and synthesize them. They need many concrete examples from which to make their basic abstractions of how the environment is affected by the individual.

As teachers and librarians read this bibliography, many of the materials, particularly the books, will be familiar. This should help to make it clear that environmental education is not a new subject that must be added to the curriculum but rather an "umbrella" under which all the disciplines can be gathered and thus interrelated.
Books for Students
Grade 4 - Grade 6

Exciting alternatives in playground design offering the variety, adventure and fantasy opportunities of play in the countryside to city children looked after by teenage play-leaders. After looking at the illustrations and discussing the ideas, children could follow up with models of their own.
Related books: Binzen, Bill MIQUEL'S MOUNTAIN
Clymer, Ellen BIG PILE OF DIRT
Selden, G. TUCK'S COUNTRYSIDE

This is one volume in the series OUR LIVING WORLD OF NATURE. Each book deals with an American biome, such as the forest, the seashore, or the desert, and leads the reader to an understanding of interrelationships within the biome. Written in an easy-to-follow, lively style. The illustrations, charts and diagrams aid greatly in making this a most useful reference set. In the appendix of each of these books, you will find a glossary, a bibliography, guides to identification, and ideas for science activities. A teacher's guide is available.

In pictures of deceptive simplicity, optical illusions form structures in which curious little men can go upstairs to get to a lower place, hang pictures on the ceiling, and walk on walls. How would the room look if you could walk on the ceiling? An amusing and imaginative way to stimulate visual perception. See Environmental Geometry cited under Curriculum materials.

Broad introduction to wise utilization of natural resources. Emphasizes water as a basic and indispensable yet, exhaustible resource. Useful for lead-up to unit on pollution. Good photographs.
Related books: Buehr, Walter WATER: OUR VITAL NEED
Goetz, D. RIVERS
Helfman, Elizabeth RIVERS & WATERSHEDS
IN AMERICA'S FUTURE
Helfman, E. WATER FOR THE WORLD
Shuttlesworth, Dorothy CLEAN AIR-SPARKLING WATER: THE FIGHT AGAINST POLLUTION

Behn, Harry, Comp. & Tr. CRICKET SONGS: JAPANESE HAiku
This book, admirably illustrated with carefully chosen pictures by Japanese masters, should inspire children to put down their own impressions of nature in haiku form.

Facts about animals and plants are correlated to show how each has adapted to particular environmental changes. The last section asks whether or not animals and plants can adapt to adverse environmental conditions, and if not, whether people will use the adaptations they have in an attempt to stop environmental pollution. Correlate with studies of other lands and vanishing species.

Billington, Elizabeth UNDERSTANDING ECOLOGY Warne, 1968.

A clear and simple study of ecology from how to get ready to be an "explorer" to explorations of the four parts of the ecosystem and how they affect each other. Excellent diagrams, good index. This book and similar ones cited should be used to introduce and/or supplement actual outdoor experiences, not to substitute for them.

Related books: Hirsch, S.C. THE LIVING COMMUNITY
Kane, Henry B. TALE OF A MEADOW
Marchant, R.A. WHERE ANIMALS LIVE
Pettit, Ted WEB OF LIFE
Pringle, L.P. DISCOVERING THE OUTDOORS
Raskin, Edith PYRAMID OF LIVING THINGS
Selsam, M. SEE THROUGH THE FOREST
Waters, J.F. NEIGHBORHOOD PUDDLE

Blake, Peter GOD'S OWN JUNKYARD Holt, 1964.

Contrasting examples of deterioration and beauty in cities, along roads, and in the sky are introduced by brief essays and illustrated with photographs. Can be used in conjunction with discussions on almost any environmental problem. Text suitable for junior high but illustrations useful in elementary school. Use in conjunction with PLANNING FOR CHANGE cited under Curriculum Materials.

Bronson, Wilfrid S. FREEDOM & PLENTY: OURS TO SAVE Harcourt, 1953.

In graphic text and numerous illustrations, the author gives a broad survey of conservation problems - how our natural resources have been wasted and how they can be saved. Cartoon-like illustrations might well inspire a class to draw their own cartoons to dramatize those issues which interest them the most.

Buck, Margaret Waring IN WOODS AND FIELDS Abingdon, 1950.

Arranged by season and then by habitat, are descriptions of several hundred birds, bugs, small animals, flowers, trees and shrubs. Abundance of black and white illustrations. Useful for children who have not yet learned to use a field guide. Index with Latin names and reading list at end. There are two more books by Buck similar in format: IN PONDS AND STREAMS and IN YARDS AND GARDENS.

The concept of city growth is presented at picture book level in this story. It shows how neighborhoods change and what happens as cities grow and devour more and more space.

Students can be led into a discussion of the changes they have seen and those about which their parents and grandparents have told them—and then speculate on what's ahead.


Photographs by Arline Strong with an explanatory text acquaint children with the ecology of living things in unlikely city habitats. This is one volume in an excellent series entitled Discovering Nature.


Ethology, the study of the behavior of animals in their natural habitat, is the subject of this well written and accurate book. It includes descriptions of the work of understanding ethologists and in the final chapter, focuses on man's behavior.

Related books: Lorenz, Conred *KING SOLOMON'S RING* Tinbergen, Niko *ANIMAL BEHAVIOUR* (Young Reader's Edition)


The importance of wildlife in the development and growth of the settlers. Use in conjunction with Mason's WILDLIFE OF NORTH AMERICA and Stoutenberg's ANIMALS AT BAY.

Dunning, Steven et al *REFLECTIONS ON A GIFT OF WATERMELON PICKLE AND OTHER MODERN VERSE* Scott Foresman, 1966.

A fresh collection of modern verse. Striking photographs are imaginatively matched to subjects to make an unusual volume. Language arts and environmental studies wonderfully combined.

Elkin, Benjamin *LOUDEST NOISE IN THE WORLD* Hale, 1954.

A picture story of a small boy's birthday wish with a surprise ending. James Daugherty's vigorous illustrations are wonderfully "noisy". Could well be used before going on a "listening walk" or when introducing noise pollution to older children. Fun to dramatize.

Aileen Fisher's love of nature comes bursting out of this collection of her poems. By seeing ordinary things in new ways she jolts her reader humorously into doing the same.

Related books: Cole, William **I WENT TO THE ANIMAL FAIR**
Fisher, Aileen **I WONDER HOW, I WONDER WHY**
Weiss, Rene **A PAPER ZOO**

Gabel, Margaret **SPARROWS DON'T DROP CANDY WRAPPERS** Dodd, 1971.

In simple terms the author points out that each individual is responsible for various aspects of the pollution of our environment. The book contains practical suggestions for individual action, and suggestions for group discussions.

Related books: Leaf, Munro **WHO CARES? I DO**
Hyde, Margaret **POLLUTION FIGHTERS**

Hawkinson, John **COLLECT, PRINT AND PAINT FROM NATURE** Whitman, 1963.

An inviting and inspirational book that offers the means for creative expression to further enrich an outdoor activity. Nature crafts provide a pleasurable and effective way of increasing sensory perception and heightening creative experiences.

Related books: Bale, R.O. **CREATIVE NATURE CRAFTS**
Foster, L. **KEEPING THE PLANTS YOU PICK**
Jaeger, E. **NATURE CRAFTS**
Saunders, J.R. **GOLDEN BOOK OF NATURE CRAFTS**

Helfman, Elizabeth **SIGNS AND SYMBOLS AROUND THE WORLD** Lothrop, 1967.

How signs and symbols have helped man communicate from cave painting to modern times. Carry this a step further into the study of visual pollution. Children can discuss, search out and design attractive street graphics. Use these in a model of their neighborhood or city, better still have the best of them put into use in the school. Great possibilities here for increased visual awareness.

Related book: Sutton, James **SIGNS IN ACTION**


Softly evocative photographs of nature in the city. Short captions help to catch the mood and season. Both adults and children need to become more aware of the natural beauty in the city. Use a book like this as a starting point, then go out and LOOK.

Related book: Munari, Bruno **CIRCUS IN THE MIST**

Lovoos, Janice **DESIGN IS A DANDELION** Golden Gate, 1966.

To introduce children to the wonders of design all around them, "nature is the great designer". Uses examples found in nature to explain such things as form, texture, balance, rhythm, and contrast.
Related books: Downer, Marion DISCOVERING DESIGN
Harlow, W.M. PATTERNS OF LIFE
Hart, Tony THE YOUNG DESIGNER

Mason, George Frederick THE WILDLIFE OF NORTH AMERICA

Well illustrated, very readable account which gives a
brief history of North American wildlife, reveals some of
the situations that caused animals to become extinct, and
discusses the effects of diminishing natural areas, toxic
pesticides and water pollution on animal and plant life.
The author emphasizes the importance of conservation and
describes past and current conservation methods. Includes
chart of geological areas, maps of U.S. wildlife refuge sys-
tems and Canadian National Parks, and a bibliography.

Related books: Buller, John HEALING WORLD
Laycock, George AMERICA'S ENDANGERED
WILDLIFE
Laycock, G. THE PELICANS
McClung, R. LOST WILD AMERICA
McCoy, J.C. NATURE SLEUTHS
McCoy, J.C. SHADOWS OVER THE LAND
Finney, Roy VANISHING WILDLIFE
Scheffer, V.B. LITTLE Calf (adaptation
of Year of the Whale)
Stoutenberg, A. ANIMALS AT RAY
Van Dersal, W.R. WILDLIFE FOR AMERICA
Wood, F. ANIMALS IN DANGER


We can learn a lot about the past by examining the
"junk" people leave behind. What we have kept and why we
have discarded certain other things. Shows how people change
their ideas, their way of life, and influences which help to
bring about change.

O'Neill, Mary HAILSTONES & HALIBUT BONES: ADVENTURES IN

Clever imagery and word play in verses heightened by
Leonard Weisgard's illustrations. Lands itself to art and
language arts as well as natural history.


A concise, honest statement of man's abuse of his planet
(reductions of wildlands, pollution of the air, and use of
insecticides) documented with telling photographs. Sound
introductory material.

Pringle, Laurence ONE EARTH, MANY PEOPLE: THE CHALLENGE

The author makes the problem very plain as he analyzes
conflicting opinions and takes a sobering look into the
future.

A glorious book, with many masterly photographs, showing how various primitive cultures the world over have designed and built homes and other structures which conform to the land, their ideas about nature, and their religions.

This ties in well with the study of communities in elementary social studies.

Related books:  Burns, Wm.  WORLD FULL OF HOUSES  Downer, Marion  ROOFS OVER AMERICA  Robbin, Irving  CAVES TO SKYSCRAPERS


This 1971 issue concentrates on environmental problems. There is a special three-part feature entitled The Fate of Our Lakes which contains an excellent series of overlays demonstrating the process of eutrophication.

Webster, David  SNOW STUMPERS  Natural History Press, 1968.

The first section of this book is a collection of black and white photographs, grouped by themes such as Snow Along the Road, Tracks in the Snow, Solid Ice. A stimulating question accompanies each picture. Children should be able to find many other "Snow Stumpers" on their own as they study this aspect of their environment. Answers appear at the end of each theme. The second section describes science activities involving ice and snow.


Seventy projects concerning all facets of winter, from both the physical and the biological aspects. Written for children but provides many useful ideas for teachers. Could well be used in conjunction with Webster's SNOW STUMPERS.

Related books:  Busch, Phyllis  A WALK IN THE SNOW  Russell, H.R.  WINTER SEARCH PARTY: A GUIDE TO INSECTS AND OTHER INVERTEBRATES
BOOKS FOR TEACHERS

Grade 4 - Grade 6 (activity grades)

Comstock, Anna B. **HANDBOOK OF NATURE STUDY** Cornell University Press, 1939.
A classic among general nature activity books, written by an elementary school teacher for teachers. Nature activities, for indoors and outdoors, described in detail. Drawback in that interrelationships are not emphasized but does contain materials that cannot be found elsewhere - e.g. domestic animals.

Hammerman, Donald R. & Wm. H. Hammerman **TEACHING IN THE OUTDOORS** Burgess, 1964.
Defines outdoor education and its relation to the school curriculum. Gives specific activities and techniques for teaching in the outdoors that relate to language arts, social studies, math, and the like, at all grade levels.

Covers all aspects of nature study with countless detailed suggested activities and projects. A "Project Index" lists 400 additional projects particularly suited for group work, graded according to degree of knowledge, effort, and equipment required.

More than 350 suggestions for outdoor activities to enrich every area of the curriculum. A listing of activities by grade level (1-9) is a useful addition. Currently out-of-print but certainly worth pursuing in libraries.

A concise, well-illustrated book, with emphasis on the preschool and elementary levels. It contains good coverage of the whole area of motivation and offers specific examples for the beginner.

Morse, Jim & Nancy Matthews **THE SIERRA CLUB SURVIVAL SONGBOOK** Sierra Club, 1971.
A wide sampling of the best environmental songs in America today. The lyrics, and music for guitar are included. Certainly a must for all school libraries. Current musical selections can be used to introduce many aspects of environmental problems.

Musselman, Virginia W. **LEARNING ABOUT NATURE THROUGH GAMES** Stackpole, 1967.
Playing games is one more excellent means of developing environmental awareness. This book offers many suggestions that will enliven all aspects of the curriculum.
A wonderfully rich source of imaginative ideas to encourage children to think creatively and critically. This is one in the series of Ideabooks all of which are worthwhile.  
Related book:  Koch, Kenneth  WISHES, LIES & DREAMS:  
TEACHING CHILDREN TO WRITE POETRY  Random, 1970.

New ideas for practical art lessons in the elementary school. Using these sixty easy-to-follow, imaginative lesson plans you can recycle all manner of materials from home and yard.

Subersky, Zacharian et al  LIVING THINGS IN FIELD & CLASSROOM  Minnesota School Math & Science Center, University of Minnesota, 1969.  
A handbook for teachers of elementary grades to help them give children firsthand experiences with living things, and to coordinate outdoor teaching with the indoor curriculum.

This paperback manual prepared by members of the Department of Outdoor Teacher Education, Laredo Taft Field Campus, Northern Illinois University offers many helpful suggestions involving all areas of the curriculum.

A wealth of suggestions using the natural environment that can be co-related with the school curriculum.

A sensory approach to ecological environment that can be used at any grade level. Suggestions for activities, and techniques for control, in an outdoor situation.

Wensberg, Katherine  EXPERIENCES WITH LIVING THINGS: AN INTRODUCTION TO ECOLOGY FOR FIVE TO EIGHT YEAR OLDS  Beacon Press, 1966.  
An "experience first" approach to ecology with a rich variety of suggestions for explorations and activities stressing the interrelationships in nature. A story concludes each topic. Excellent bibliographic references are listed for each experience.
BOOKS FOR TEACHERS
Grade 4 - Grade 6 (background reading)

"Kaleidoscopic view of the moods, mods, and meanings of youth activities in contemporary America." Specific teaching strategies that will help every teacher are outlined.
Related books: Metcalf, L.E. VALUES EDUCATION
Simon, S.B. CLARIFYING VALUES

Buchabaum, Ralph & Mildred BASIC ECOLOGY Boxwood, 1957.
As the title indicates, a basic introduction to ecology for beginners in the field. Useful bibliography that includes journals and textbooks as well as titles under special aspects of ecology.
Related books: Darling, Lois PLACE IN THE SUN
Kormondy, E.J. PRINCIPLES OF ECOLOGY

Excellent introduction to ecology covering all aspects of plant-animal-man relationships. Many full-page illustrations throughout make this useful for browsing for all age groups. The other volumes in this Life Nature Library are a valuable addition to any classroom.

The readings are relatively short (6-page maximum), numerous, and cover philosophy, history, mechanics, programs, teacher education, evaluation, and research. Useful source of ideas and quotations when "selling" the outdoor classroom to administrators and school committees.

Harris, Melville ENVIRONMENTAL STUDIES Citation, 1971.
A brief readable account of the increasing emphasis in Britain on the use of direct experiences in the environment outside the school. Case studies are cited.
This is one volume in an excellent series entitled Informal Schools in Britain Today.

Undoubtedly one of the most quoted authors in the field on conservation. A collection of essays that points up the concept of a land ethic and the need for man to recognize his place in relation to the entire community of things organic and inorganic.

Explains in simple language and with great clarity the complex term "Balance of Nature." To better understand the
place and effect of man on the ecosystem read Storer's MAN IN THE WEB OF LIFE.

Roth, C.E. MOST DANGEROUS ANIMAL IN THE WORLD Addison-Wesley, 1971.

Terry, Mark TEACHING FOR SURVIVAL Ballantine, 1971.
"Those who are in a position to teach, and to lead others to learn and act, can hardly find a better guide to environmental action than this richly detailed discussion . . ."

Our environment is being ravaged to maintain a high standard of consumption, not a high standard of living. This book tells how changing our life style is crucial if we are to survive—with practical advice for groups and individuals.

Related books: DeBell, Garrett ENVIRONMENTAL HANDBOOK Disch, Robert ECOLOGICAL CONSCIENCE: VALUES FOR SURVIVAL
CURRICULUM MATERIALS
Grade 4 - Grade 6

ADVENTURE IN ENVIRONMENT NEED National Environmental Education Development, Silver Burdett.

The NEED program developed as an attempt to get children involved and aware of the impact of their own decisions and actions on the overall environment.

Through the NEED strands, a child begins to see that the various fragments (like math and music and history and biology) are tied into an understandable whole. These strands are 1) variety and similarity, 2) patterns, 3) interaction and interdependence, 4) continuity and change, 5) adaptation and evolution. This is one of the most imaginative programs available. Try it!


A guide to the use of the urban environment as an instructional medium. Package includes a general guide to urban environmental education; 4 packets of activity cards—one for each of the grade levels K-3, 4-6, 7-9, 10-12; and a guide to the natural history of cities.

BLUEPRINTS FOR ENVIRONMENTAL PROBLEM-SOLVING K-12 Maine Environmental Education Project.

Units designed by teachers, representing a variety of disciplines, to develop the study of five major environmental problem areas common to communities across the country. The issues studied were: Development of the School Site, Providing for Recreation, Water Quality and Sewage Disposal, and Shade Tree Care and Maintenance.

Also available "The Community Environmental Inventory" and "The School Site in Environmental Education."


A K-12 multi-disciplinary program with a problem-solving approach. This conceptual scheme is a framework in which existing courses of study can continue to be used and in which new materials can be adopted. (See "Source book for Population-Environment Studies" cited in Bibliography section).


A social studies and science curriculum for Grades 4 & 5, developed by teachers, that offers a wide variety of classroom experiments, suggestions for field trips, and supplemental activities from which the teacher might choose. Environmental concepts, as they related to the experiences of the children, are well-thought-out and can be successfully incorporated in existing courses of study.
Environmental Geometry is designed to make teachers and their students more aware of the environment as a source of mathematical activities. This guide contains a wealth of suggestions for investigations.

A booklet Antidotes to Rote from the publisher describes several other books in this series that are equally valuable.


A colorfully illustrated, paperback series of interdisciplinary environmental studies. The investigations suggested in the series will serve as starting points for students who will then wish to pursue individual interests in more depth. Some of the titles--Mini-climates, Pollution, Ecology, Mapping Small Places, Your Senses.


A British paperback handbook for elementary school teachers outlining techniques and suggesting activities with interdisciplinary, environmental emphasis.


Attractive, well-thought-out booklet. Useful in explaining objectives of environmental education to parents of grades K-6. Also from same source School Site Development for Outdoor Education.

Improve Your Environment: Fight Pollution with Pictures (#AC-26) Eastman Kodak Co.

Suggestions for a variety of photographic environmental action projects. Excellent colored illustrations.

International Unit for Grades 4-6 Information Center on Children's Cultures, U.S. Committee for UNICEF.

This unit, introduced after children have had some earlier studies of other countries, provides an interesting and unusual introduction to the economic and social interdependence of peoples. Three projects are suggested. Children will undoubtedly come up with others. Contact this Center for other units and excellent bibliographies.

Inviting Involvement with History Conservation & Environmental Science Center, New Jersey.

History lessons come alive as students are involved in direct personal experiences. All manner of possibilities here for interdisciplinary studies. This Center has produced several other excellent units.

The Land Use Game Education Ventures, Inc., 1971.

Land Use confronts students with an actual problem of trying to provide for human needs while preserving environ-
mental values to the greatest extent possible. Student planning groups have an opportunity to test their own value judgments in a "contest" with environmental facts. A separate teaching guide suggests game variations and discussion possibilities.

An outstanding simulation game at a very reasonable price.

MAINE ENVIRONMENTAL EDUCATION PROJECT  Dean Bennett, Coordinator.

A theme environment has been chosen for each grade level. "Within the theme environment, students will be encouraged to interact with the environment or utilize resources in interesting ways and, in so doing, they will become aware of, or guided in, the identification of past, present, or pending environmental problems."

MAN: A COURSE OF STUDY  Education Development Center.

This fifth grade course seeks to answer the question: "What is human about human beings?" The course, as developed to date, is available for purchase under "controlled conditions" which means teachers must attend a National Science Foundation Workshop and schools must purchase the necessary materials. The course has a conceptual structure of knowledge. Through the study of salmon, herring gulls, baboons, and finally, the Netsilik Eskimos, the students perceive the continuity from animal to man on the themes of "life cycle," "learning," "parenthood," and "social organizations." A distinctive part of the course is the variety of instructional materials, both printed and audio-visual. The films and slides are superb.

MAN AND HIS ENVIRONMENT: AN INTRODUCTION TO USING ENVIRONMENTAL STUDY AREAS  Association of Classroom Teachers NEA, 1970.

A new interdisciplinary approach to environmental education at all school levels. It provides practical suggestions for classroom teachers for use of the environment to help students understand relationships between man and his environment. A unique aspect of this approach is the utilization of five "strands" which can be applied to any subject area. A filmstrip, also entitled Man and His Environment, will orient administrators, teachers, and the public to this strand approach.


Describes ways to build balanced ecosystems within the classroom using low-cost materials.

NUFFIELD JUNIOR SCIENCE PROJECT  Wm. Collins Sons, 1967.

The Nuffield Junior Science Project is a large scale British experiment in education, in which young children
were introduced to the excitement of practical investigation and scientific observation.

Teacher's Guide I sets out the general educational thinking of the project. Subsequent chapters interpret that thinking in terms of exceptional classroom situations.

Teacher's Guide II presents 38 live case histories, each a faithful record of a project showing graphically its starting point and the varied work following from it. These charts vividly point up the interdisciplinary emphasis of the project.

There are three background booklets, and two other books also available--Apparatus and Animals and Plants. All offer many excellent ideas.

FOND WATER Elementary Science Study (ESS) Education Development Center.

This is a unit, developed to extend over a period of at least five or six weeks, introducing children to the variety of pond life. There are two sets of cards: (1) Method cards carry helpful information about keeping pond water animals alive, making good slides, etc.; (2) Animal and Plant cards which identify and describe individual animals and plants that children may find in their pond water. This is an unstructured unit with emphasis on observation and inquiry.

The teacher's guide contains background information and suggestions for activities. ESS has produced many other units. Among them are Animals in the Classroom, Tracks, Structures.

POPULATION REFERENCE BUREAU


P.R.B. is the best source of information of facts about size, composition and dynamics of the world's population and analyses of the impact of these demographic facts on the quality of human life throughout the world. Membership is only $5.00 for teachers and all members receive all regular P.R.B. publications.

PROGRAMS IN ENVIRONMENTAL EDUCATION National Science Teachers' Association (NSTA).

Describes over 50 programs in schools around the country. Programs include all formats and grade levels. Only programs now underway and able to distribute materials and/or information have been analyzed.

RESOURCE UNIT ON POPULATION PRESSURE Baltimore City Public Schools, Bureau of Publications, Baltimore, Maryland.

A Teacher's Guide for the teachers of the Baltimore Public Schools at all levels. The pamphlet attempts to alert teachers to population pressure at local to international levels. Background information is presented, suggested approaches given, and a bibliography of instructional materials is included.
SALT MARSH, SOUND, AND SEA BEACH  Regional Marine Science Project, 1970.

One of several units developed in this Title III Project and available at cost. All the materials take an ecological approach to nature, stressing the ties between cultures, economy and resource use. Field work is an integral part of the curriculum.


This issue of the NCSS journal is entirely devoted to The Environmental Crisis incorporating an interdisciplinary approach. There is also a lengthy section on sources and resources and instructional media.

SPECIAL EDUCATION  April 1972, Vol 36, No. 4 National Council for the Social Studies.

This issue is devoted to population education and contains the widest multi-media coverage yet given to this topic. This journal should certainly be available to teachers.


This K-6 series is one of the best of the very few social studies texts emphasizing basic ecological concepts. "Concepts and values--the concepts of man as a social being, and the values that make him human--are the substance of this program. The sustaining theme is responsibility--responsibility for oneself, for mankind and for the environment."


The introduction emphasizes the need for environmental and conservation education, and advocates an inquiry approach. Outdoor resources available to every school are listed. Detailed suggestions are made for investigations, references are cited, and student activities are suggested.


An interdisciplinary approach that includes mathematics, science and social studies. The materials needed are simple, inexpensive, readily available, and familiar. The activities offer a positive approach to the study of pollution.
FILMSTRIPS
Grade 4 - Grade 6

AMERICA'S URBAN CRISIS--Group I. SVE, Sound, Color.
On site photography in six major U.S. cities provides a survey of environmental problems. The filmstrips on solid waste, transportation, and housing are useful in conjunction with Doing Germantown cited under Curriculum Materials.

COMMUNITIES OF LIVING THINGS McGraw-Hill Silent, Color.
Series Titles: Animals, Plants and their Environment, Animal & Plant Relationships, Animals and Plants of the Forest, . . . the Field . . . the Pond . . . the City.
Explains in simple terms the interdependence of animals and plants to each other and to their environment, and portrays the interrelated system in which whole organisms and their environment function.

CONSERVATION FOR TODAY'S AMERICA SVE, Sound, Color.
This series deals with the need for the conservation of our natural resources and analyzes the problems arising from that need. Some solutions are given which should generate group discussion and further study. Good photography. Can be used at all levels if adapted to group. Each film might be used as a course introduction.

DISCOVERING LIFE AROUND US Encyclopedia Britannica Silent, Color.
Series Titles: A Visit to the Farm, A Visit to the Garden, A Visit to the Pond, A Visit to the Seashore, A Visit to the Woods.
Shows relationship between living things and introduces some ecological concepts. Size relationships in film are not true and some vocabulary will need explaining. Can be used to introduce discussion of familiar areas or as a prelude to a field trip.

This series introduces basic ecological principles and vocabulary, and each film develops in sequence a major concept. Excellent color, good questions for discussion. They may be adapted for use according to ability. Supplementary information and explanation by user is necessary.
This series shows how the basic ecological principles operate in the major biomes and habitats. Prior knowledge of concepts and terminology is necessary for use of these filmstrips. The color is excellent, good discussion material adaptable according to ability.

Presented in this series are man's successes and failures in managing nature for his own benefit, and problems presented by the failures. Users should be familiar with basic ecological principles and terminology. Manual has good discussion questions and suggestions for activities and further reading.

EXPLORING THE WORLD OF NATURE S.V.E. Silent, Color.
Series Titles: (Group I) Let's Explore a Field ... A Lawn ... A Pond ... A Stream ... A Woodland.
Series Titles: (Group II) Let's Explore the City, Part I & Part II, Let's Explore the Dunes ... The Desert ... The Shore ... A Salt Marsh.
Vocabulary level consistent, good questions and ideas for further explorations. Useful prior to field trips, as an introduction to study of plants and animals, or discussions.

MODERN BIOLOGY: ENVIRONMENT AND SURVIVAL S.V.E. Silent, Color.
Explains animal-environmental interdependence, plant/animal communities, importance of biotic and abiotic conditions. This group is of particular value because of the unusual communities which it includes.

PLANT AND ANIMAL RELATIONSHIPS Encyclopedia Britannica Silent, Color.
These filmstrips present two basic ideas; that all organisms are part of interdependent living systems called communities, and that they are especially adapted to their particular environment. The charts and diagrams are very useable, and the suggestions for further study and discussion very good.
ANIMAL & PLANT COMMUNITIES SERIES STUDY PRINTS McGraw-Hill.
Series Titles: Where Plants Live, Freshwater Community, Forest Community, Desert Community, Seashore Community.
Durable, full color photographs. The community approach is well thought out. The textual material on the back of the prints is in large type and the vocabulary is geared to the student. Thoughtful questions in this text add to the value of these study prints.

CONSERVATION POSTER SET J. Weston Walch, Publisher.
Each poster carries a large illustration and a thought-provoking commentary. Posters in each set are coordinated to give a survey of the area under study. 18 posters per set, 11" x 14". The sets include such titles as: Ecology of the City, Conservation of Wildlife, Air Pollution.

ECOLOGY WHYS Carnegie Museum.
Two sets of six charts each, on heavy cardboard 20" x 24". Charts cover such subjects as Animal Homes in Trees, Soil - How It Is Made, What Good Are Trees, Succession on a Fallen Log. Accompanying teacher's manuals contain a lesson plan, follow-up activities, a glossary and a reading list.

ENVIRONMENTAL EDUCATION CHARTS Gull Lake Environmental Education Project.
Illustrations and text describing food, habitat, distribution, reproductive and annual cycles, distinguishing characteristics and identification of several different animals. Also a pond life chart depicting food chains and energy cycles.

HISTORIC STAMP POSTERS U.S. Postal Service, Washington, D.C.
A full color, 30" x 40", poster of nine of the conservation stamp series could become the focus for a stamp collection display on environmental issues.

Colorful painting 42½" x 29½" (order from National Geographic Society) depicts many sources of man-made pollution.

This poster series was designed for use by teachers and pupils of elementary grades. The teacher's guide provides background information and suggested activities for each poster. Another series, similar in format, is entitled Eco-Problems.

LIFE EDUCATIONAL REPRINTS Life Education Program.
The editors of Life have reprinted many of the pictorial essays for use in schools. The series from the World We Live
IN is an excellent source of pictures for ecological studies at any grade level.

NATIONAL WILDLIFE WEEK National Wildlife Federation.
An annual event in March which focuses attention on different aspects of wildlife each year. Kits, which include posters and suggested activities, are available to teachers free of charge.

STUDY PRINTS Singer
13" x 13" photographs on heavy stock in sets of 8. On the reverse of each print is factual information, questions, and suggestions for use. The Basic Science Series covers plants, animals, cloud forms, and land forms of running water. Urban Life Series introduces the child to some of the ways the people of the city work and play.
MAGAZINES  
Grade 4 - Grade 6

AUDUBON National Audubon Society, 950 Third Avenue, New York, N.Y. $10.00 with individual membership in Society "for the conservation and appreciation of wildlife and wilderness, natural resources and natural beauty." Bi-monthly 130 pages, noted for its excellence of material and color photography. A wonderful source for a picture file.

THE CONSERVATIONIST State of New York Department of Environmental Conservation, Albany, N.Y. 12201. $2.00 per year, $5.00 for three years. Bi-monthly. The colored center spread and accompanying article, including teaching suggestions, is a most valuable aid.

THE JOURNAL OF ENVIRONMENTAL EDUCATION Dembar Educational Research Services, Box 1603, Madison, Wisconsin 53701. $7.50 subscription, $5.00 for students, $2.00 single copy. Quarterly, 48 pages, black and white, no photographs, "devoted to research and development in conservation communications." Vital addition to professional libraries in every school.

KIDS Kid's Publishers, Inc., 777 Third Avenue, New York 10017. $5.00 per year subscription, 50¢ each. "The magazine by kids for each other;" poems, stories, cartoons, photos, paintings and more. 10 issues per year, 50 pages.


NATIONAL WILDLIFE National Wildlife Federation, 1412 16th St., N.W., Washington, D.C. 20036. $6.50 per year, Bi-monthly, 55 pages, noted for many color photographs. There are Environmental Education materials available, also a kit for National Wildlife Week. "Ideas for Learning" a teacher's guide to National Wildlife is now being published. National Wildlife also publishes International Wildlife, similar in format and with "Ideas for Learning" guide free to teachers.

PACK-O-FUN John M. Clapper, 14 Main Street, Parkridge, Ill. 60068. $5.00 per year ($10.00 for 3 years) Monthly. Arts and crafts projects with holiday and/or seasonal emphasis. A wealth of ideas for recycling all manner of materials.

SCHOOL ARTS  72 Printer Building, Worcester, Mass., 01608. $7.00 per year. Monthly September-June. The art magazine for teachers, with new ideas, latest techniques and practical help. Articles and activities to increase student's environmental awareness.

SCIENCE AND CHILDREN  National Science Teachers Association, 1201 16th Street, N.W., Washington, D.C. 20036. $4.00 per year subscription, 75¢ single copy, published September-December and February-May, 30 pages, black-and-white. Many valuable teaching suggestions.

THE YOUNG NATURALIST  Federation of Ontario Naturalists, 1262 Don Mills Road, Don Mills, Ontario, Canada. $3.00 subscription, 10 issues per year, 8 pages, natural history subjects.
Bibliography of Aids to Environmental Education

Grades VII Through IX

In grades seven to nine, youngsters are undergoing many physical and psychological changes. They are questioning much and examining the basic value systems they have so far largely taken for granted. It is, thus, a time to look at broad environmental issues and examine not only the basic concepts needed to deal with them, but the basic assumptions and values that undergird our traditional approaches to them.

This is one volume in the series OUR LIVING WORLD OF NATURE. Each book deals with an American biome, such as the forest, the seashore, or the desert, and leads the reader to an understanding of interrelationships within the biome. Written in an easy-to-follow, lively style. The illustrations, charts and diagrams aid greatly in making this a most useful reference set. In the appendix of each of these books you will find a glossary, a bibliography, guides to identification and ideas for science activities. A teacher's guide is available.


The author reports objectively about religions in many parts of the world, ancient as well as contemporary. The reader will gain a sense of the durability of primitive religions even into the present day and of their effects within the particular cultures on the interactions of man with his environment. Examine these to see how the values and assumptions influence contemporary attitudes.


Emphasizes the interaction and interdependence of all things with each other and with their environment. Points up the biological analogy between the forest and the sea.

Billington, Elizabeth UNDERSTANDING ECOLOGY Warne, 1968.

A clear, carefully written introduction to ecology. Well illustrated. Easy reading.

Related books: Friendly, N. MIRACULOUS WEB: THE BALANCE OF LIFE Nickelsburg, Janet ECOLOGY: HABITATS, NICHES & FOOD CHAINS

Blake, Peter GOD'S OWN JUNKYARD Holt, 1964.

Excellent illustrations and vigorous reading on the "Planned deterioration of America's landscape." Contrasting examples of deterioration and beauty in towns, along roads, in the sky, are introduced by brief essays, illustrated with numerous photographs and highlighted with quotations. Can be used in conjunction with discussions on almost any environmental problem. Excellent suggestions for local projects depicting pollution will be found in IMPROVE YOUR ENVIRONMENT listed in Curriculum Materials section.

Buchsbaum, Ralph and Mildred BASIC ECOLOGY Boxwood, 1957.

As the title indicates, a basic introduction to ecology for beginners in the field. Useful bibliography that includes journals and textbooks as well as titles under special aspects of ecology.
The growth of the automotive industry revolutionized the lives of Americans at all levels of society and is now a subject of increasing controversy. For other materials see THE AUTO--THE ENVIRONMENT--AND VALUES in the Curriculum Materials Section.

Cohen, Daniel  
WATCHERS IN THE WILD  
Ethology, the study of the behaviour of animals in their natural habitat, is the subject of this well-written and accurate book. It includes descriptions of the work of outstanding ethologists and in the final chapter, focuses on man's behaviour.

Related books:  
Carrighar, Sally  
WILD HERITAGE  
Lorenz, Conrad  
KING SOLOMON'S RING  
Tinbergen, Niko  
ANIMAL BEHAVIOUR

Cook, Robert & Jane Lecht  
PEOPLE  
This booklet describes how and why world population is growing rapidly, and the effects on industrial nations as well as on "the other two-thirds" of the world's people and offers some means of coping with the problem.

Davies, Delwyn  
FRESH WATER  
Natural History Press, 1969.  
Description of the special chemical and physical properties that account for water's dominant position in the living world and the relevance of these properties to man's own physiological processes. Excellent illustrations.

Davies, J. Clarence III  
THE POLITICS OF POLLUTION  
Pegasus, 1970.  
An elementary, instructive and readable account of pollution control from the viewpoint of a political scientist. Would fit well with work students using the Tilton Water Pollution Project A CURRICULUM ACTIVITIES GUIDE TO WATER POLLUTION AND ENVIRONMENTAL STUDIES. (See Curriculum Materials Section)

DeBell, Garrett ed.  
ENVIRONMENTAL HANDBOOK  
Ballantine, 1970.  
About four-fifths of the Handbook deals with the "Meaning of Ecology" and consists of thirty-one readings which "explore the nature of some of the causes and some of the possible solutions to the major problems in the environmental crisis." The remaining portion has two short sections "Eco-Tactics: Individual Action" and "Eco-Tactics: Political Actions." Good list of films and a bibliography. Useful material for discussion of changes in life styles and their underlying values.

Disch, Robert  
THE ECOLOGICAL CONSCIENCE: VALUES FOR SURVIVAL  
A well-chosen anthology which considers the scientific sociological and political aspects of our present ecological values.

Changing life styles is a current topic of vital interest. Well-written biographies can play an importance in helping junior high students to analyze their own ideas on this score.


CONSERVATION OF NATURE brings to young people an awareness and understanding of current problems in the preservation of the fitness of our natural resources. Excellent photographs from international sources serves to indicate vividly the global aspects of the concern for the preservation of our natural resources.

Further reading: J.A. Lauwers MAN'S IMPACT ON NATURE W.M.S. Russell MAN, NATURE AND HISTORY

Dunning, Steven et al. REFLECTIONS ON A GIFT OF WATERMELON PICKLE AND OTHER MODERN VERSE Scott Foresman, 1966.

A fresh collection of modern verse. Striking photographs are imaginatively matched to subjects to make an unusual volume. Language arts and environmental studies wonderfully combined.


Comprehensive analysis, taken from a broad ecological approach, of worldwide population growth with resulting demands on food and other resources. The bibliographies at the end of each chapter add greatly to the value of this reference. A Teacher's Guide is also available upon request from W.H. Freeman Company.


DIMENSIONS OF CHANGE describes a collision course between what we are and what we could be. The time span is the next thirty years.

Quotations, illustrations, ideas, the entire format set this book apart. Even the most jaded of readers will find something to spark him.

An earlier book by Don Fabun DYNAMICS OF CHANGE Prentice-Hall, 1967, is equally intriguing. Both these books have an air of science fiction about them that would tie in well with a unit on that subject. See Sauer VOYAGES cited later in text.

Farb, Peter and the Editors of Life ECOLOGY Silver-Burdett, 1963.

Excellent introduction to ecology covering all aspects of plant-animal-man relationships. Many full-page illustrations throughout make this useful for browsing for all age groups. The other volumes in this Life Nature Library are a valuable addition to any classroom.

This is a survey of two-year, post-high school programs related to ecology. Possibilities here for high school work-study programs. As students are studying environmental problems in the classroom, they should be alerted to the careers open to them in these problem areas.

Further reading:
- Panning OPPORTUNITIES IN ENVIRONMENTAL CAREERS
- Paradis RECLAIMING THE EARTH: JOBS THAT HELP IMPROVE THE ENVIRONMENT
- Munzer PLANNING OUR TOWN (cited below)

A boy leaves home to live secretly in the woods, carrying only a knife and writing materials. An excellent absorbing story that appeals to the instinct for freedom and survival.

Another fictional account of survival, an Indian girl on the California coast, the ISLAND OF THE BLUE DOLPHINS by Scott O'Dell.

"If you want others to act and live more compatible with our environment, if you want to influence the value judgments that they make, you can do this best by showing others examples of what is possible. We call this "Environmental Practice." Rich source of ideas for school and community action.

Distinguished biologists were asked to prepare papers exhibiting their concern for significant social problems having a biological basis. These papers were then distributed to a panel who, at the 1969 NABT Convention, then entered into lively discussions with the biologists. The fields which are covered are medicine, behaviour, genetics, population and evolution. Excellent background reading for teachers who should go on to read the science fiction based on the projection of these social problems and to include both the facts and the science fiction in their courses.

See Sauer VOYAGES on this checklist for some excellent references.

A dynamically illustrated introduction to ecological concepts. Cycles and interdependence are emphasized.
Related books: Darling, Lois A PLACE IN THE SUN
Reid, Keith NATURE'S NETWORK: THE STORY OF ECOLOGY

Teachers will gain much in understanding human behaviour
as reflected in space relationships. The author's SILENT LANGUAGE will open their eyes to the influence of non-verbal communication.

Hamilton, Edith MYTHOLOGY Little, Brown, 1942.
A book of Greek, Roman and Norse myths. Traditional folklore reflects the values and assumptions of a culture. Examine some of these to see how they might have contributed to some of our contemporary environmental problems. A number of excellent anthologies are available.

The readings are relatively short (6 page maximum), numerous and cover philosophy, history, mechanics, programs, teacher education, evaluation, and research. Useful source of ideas and quotations when "selling" the outdoor classroom to administrators and school committees.

A unique collection of short readings. Statements of historical importance as well as recent statements and comments are included. Useful in any course dealing with the social impact of science whether taught in departments of biology, anthropology, economics, sociology, geography or others.

The study of man's environment should certainly encompass art. Here is a collection of striking black and white photographs of plant life, as seen through a hand lens, that reveals the plan and symmetry of growing things. These plant patterns could provide students and teachers with new and exciting departures for creative expression. Material for mathematics is also here in the study of symmetry and spirals. See also Scheffer THE SEEING EYE Scribner, 1971.

Helfman, Elizabeth S. CELEBRATING NATURE Seabury, 1969.
Seed time, growth, harvest - from earliest times, man has celebrated this pattern of the seasons which his life depends. In this unusual book, nature rites and ceremonies from ancient and modern times, from East and West, are described, compared, and interrelated. Examine these to determine whether traces of these rites still influence our lives and in what manner.

Helfman, Elizabeth SIGNS AND SYMBOLS AROUND THE WORLD Lothrop, 1967.
How signs and symbols have helped man communicate from cave painting to modern times. Carry this a step further into the study of visual attractive street graphics. Use these
in a model of their neighborhood or city, better still have the best of them put into use in the school. Great possibilities here for increased visual awareness.

Related book: Sutton, James "SIGNS IN ACTION"


Covers all aspects of nature study with countless detailed suggestions for activities and projects. A "Project Index" lists 400 additional projects particularly suited for group work, graded according to degree of knowledge, effort, and equipment required.


An informative review of the many methods of disposing of things that are no longer useful and of the wastes of modern industry and human living. Some of the methods described and pictured are in current use, some are new developments that have not yet been implemented. Detailed bibliography. Many photographs. See "TEACHING SCIENCE WITH GARBAGE" cited under Curriculum Materials.


An excellent and timely introduction to the historic development of the ecological movement in the United States as seen through the lifeworks of eight outstanding Americans from Thoreau to Rachel Carson. Each person depicted gave much of himself to serve the quality of life in the U.S. An excellent starting point for discussion of life styles and those factors which influence an individual's way of life.

Hirsch, S. Carl "THIS IS AUTOMATION" Viking, 1964.

This book presents a brief history of automation, and explains, with remarkable clarity, how automation works. It deals with both the scientific and socio-economic aspects, thereby offering many possibilities for discussion. A bibliography suggests further reading.


This is a primer for citizen action that is ideal for class use in discussion and preparation for action programs of individual and community involvement.


Emphasizes interrelationships, and the necessity for man to apply ecological principles to his own species, in particular by stabilizing human populations. This is one volume in the Nature and Science Library published for the American Museum of Natural History. Original art, photographs, maps and charts--many in color--amplify the text.
La Farge, Oliver  **LAUGHING BOY**  Houghton-Mifflin, 1963.

The difference in the world view of the Indian and the White frontiersman are definitely expressed in this love story about a young Sioux brave, Laughing Boy, and his woman Slim Girl, who has been raised in the white settlements. As Slim Girl attempts to re-enter tribal life, the irreconcilability of the Indian and White ways become increasingly clear.

Especially impressive is La Farge's ability to transmit the meaning of a thousand small daily acts in the context of Indian beliefs about religion and nature.

Further reading:  Borland, Hal  *WHEN THE LEGENDS DIE*
Ellis, Mel  *WILD RUNNERS*
Momaday, N. Scott  *HOUSE MADE OF DAWN*


One in the  **PROBLEMS OF AMERICAN SOCIETY** Series that contains useful material for a very general introduction to the problems of air and water pollution. Easy reading.

Related books:  Kavaler, Lucy  *DANGEROUS AIR*
Marshall, James  *THE AIR WE LIVE IN*


Undoubtedly one of the most quoted authors in the field of conservation. A collection of essays that points up the concept of a land ethic and the need for man to recognize his place in relation to the entire community of things organic and inorganic.


According to Mr. Lewis, "These people had and still have secrets about living which are 'civilized' cultures could learn from. Part of their secret is that they have not broken their hold on the rhythms of the earth." Many possibilities for social studies as well as language arts.

Related book:  Belting, Natalie  *THE SUN IS A GOLDEN EARRING*

McClung, Robert M.  **LOST WILD AMERICA**  Morrow, 1970

A cohesive account of the past, the present and the future of America's wildlife, emphasizing why civilization and progress threaten wildlife and bringing out the value, in human terms, of preserving wildlife.


An inexpensive booklet prepared by two social studies teachers to foster critical thinking. There are readings, case studies and inquiry exercises. The controversies included are population, nuclear radiation, air pollution and the religious, political and economic consequences of the
ecology controversy. This booklet offers a good beginning for teachers.

Studies by a practicing landscape architect and planner exemplify the ecological planning method. Case studies of specific regions, communities and cities are given to demonstrate his concepts. Ties in well with H.S.G.P. units on city planning. (See Curriculum Materials section). Use in conjunction with LAND USE GAME cited under Curriculum Materials.

This is a survey of the present and projected energy needs of our world. The author emphasizes, and explains in layman's language, many exciting prospects for solution of the energy crisis such as solar cells, the tides, and geothermal fields. Suggested further reading and sources of information are included. Combine with a study of the mass media and its emphasis on the ever growing need for more energy. The LANGUAGE OF MAN cited under curriculum Materials has some excellent material on the mass media.

A wide sampling of the best environmental songs in America today. The lyrics, and music for guitar are included. Certainly a must for all school libraries. Current musical selections can be used to introduce many aspects of environmental problems. Listen to the records that accompany the New York Times & Guidance Associates filmstrips listed in this bibliography. A study of the lyrics is also another approach to an analysis of attitudes and values.

We can learn a lot about the past by examining the "junk" people leave behind, what we have kept and why we have discarded certain other things. Shows how people change their ideas, their way of life, and the influences which help to bring about change. Illustrated with photographs of art objects, cities, and architecture, old and new.

The author makes the problem very plain as he analyzes conflicting opinions and takes a sobering look into the future.

A concise, honest statement of man's abuse of his planet (reductions of wildlands, pollution of the air, and use of insecticides) documented with telling photographs. Sound introductory material.
Roth, Charles E.  THE MOST DANGEROUS ANIMAL IN THE WORLD  
Addison-Wesley, 1971.  
This book "explores man's basic animal nature and exam-
ines the characteristics which set man apart from all other
animals." The author goes on to show that these same unique
capabilities must be brought to bear on today's complex
environmental problems. The solutions, however, will not
come through technology but through environmental education
that will help each individual to understand his social re-
sponsibilities.

Rousseliere, Mary  BEYOND THE HIGH HILLS: A BOOK OF ESKIMO
These Eskimo songs and chants movingly celebrate daily
activities. The outstanding photographs are in full color.

Rudofsky, Bernard  ARCHITECTURE WITHOUT ARCHITECTS  Double-
day, 1970.  
A glorious book, with many masterly photographs, showing
how various primitive cultures the world over have designed
and built homes and other structures which conform to the
land, their ideas about nature, and their religions.
This volume would make an excellent companion to
McHarg's DESIGN WITH NATURE.

Sauer, Rob ed.  Forward by Dr. Paul R. and Anne H. Erlich.
Famous authors, many of them writers of science fiction,
bring to life, in a series of short stories and vignettes,
the spectre of life on an overpopulated planet. VOYAGES,
with its striking illustrations of present and impending
world problems related to the broad field of environment,
compliments books that describe the same problems in purely
theoretical terms.
Brief bibliographies at the end of each story lead the
reader to more excellent material.

Simon, Sydney et al.  CLARIFYING VALUES: A HANDBOOK OF PRACT-
30 methods for values clarification are described, with
instructions for the teacher and numerous examples of the
basic strategies.
Related books:  Barr, R.D.  VALUES & YOUTH
Metcalf, L.E.  VALUES EDUCATION
Both are available from National Council for the Social
Studies.

A college text in ecology which is a valuable reference
tool. Contains a multitude of illustrations, charts and
diagrams, plus voluminous bibliographic references.
Explains in simple language and with great clarity the complex term "Balance of Nature." To better understand the place and effect of man on the ecosystem read Storer's MAN IN THE WEB OF LIFE.

Terry, Mark  TEACHING FOR SURVIVAL  Ballantine, 1971.
Starting with the classroom, Mark Terry presents the ethical and practical means for transforming our educational system. The schools can become model environments themselves and thus serve as a central instrument for changing the society.

A synthesis of much of the current thinking on the origins of human behaviour and its relationships to some of the primates. Excellent background reading for the teacher.

Turnbull describes the traditional beliefs and customs and reports the changes, without making judgments. His material stimulates comparisons which young people should be encouraged to make for clarification rather than for evaluation of what ways are best. See GROWING UP IN... cited under Bibliographies for more resources.

Our environment is being ravaged to maintain a high standard of consumption, not a high standard of living. Changing our life style is crucial if we are to survive. This book tells how, with practical advice for groups and individuals.

Worth, Jean  MAN, EARTH AND CHANGE  Coward, 1968.
Good philosophical and historical presentation of conservation. Emphasizes problems of man's ignorance and impatience. Excellent background for social studies. One volume in the New Conservation Series, useful in a general survey course that calls for easy reading.
CURRICULUM MATERIALS
Grade 7 - Grade 9


This is a interdisciplinary reference prepared by a writing team of public school and college teachers and scientists from the social sciences, humanities and natural sciences. Sections of the manual include: 1) Atmospheric Processes, 2) Societal Aspects of Pollution, 3) Activities of man which contribute to Pollution, 4) Student-oriented Activities, and 5) a 52-page literature guide.

AMERICAN EDUCATIONAL PUBLICATIONS

- Well-illustrated, inexpensive units, good for easy-to-read, introductory material.
- OUR POLLUTED WORLD AEP staff writers, 1963. Helps students understand the scientific principles involved in both the causes and effects of pollution. Shows how this knowledge can be applied to overcome this national problem.
- THE CONSERVATION STORY George Pollock, 1969. An historical overview of great conservation battles in U.S. history. Through case studies, it probes today's most urgent conservation questions: the fight over DDT, the redwoods issue, air and water pollution, and strip mining.
- ECOLOGY: MAN EXPLORES LIFE Jacqueline L. Harris & Erwin A. Steinkamp, 1970. A study of ecology through case studies of scientists at work. As readers absorb ecological concepts, they also acquire a knowledge of scientific problem-sharing techniques.
- YOU & YOUR ENVIRONMENT Walter S. Houston, 1971. An introduction to basic ecological concepts that could be incorporated in a general science course. A Teacher's Guide is available.

THE AUTO - THE ENVIRONMENT - AND VALUES Environmental Science Center.

Students investigate the various ways the automobile has become an important part of our lives because of the cultural value we have placed on it.

For more ideas and resources see the article "Automan" in Media & Methods April, 1972.


A guide to the use of the urban environment as an instructional medium. Package includes a general guide to urban environmental education; 4 packets of activity cards—one for each of the grade levels K-3, 4-6, 7-9, 10-12; and a guide to the natural history of cities.

BLUE PRINTS FOR ENVIRONMENTAL PROBLEM-SOLVING K-12 Maine Environmental Education Project.

Units designed by teachers, representing a variety of
disciplines, to develop the study of five major environmental problem areas common to communities across the country. The issues studied were: Development of the School Site, Providing for Recreation, Water Quality & Sewage Disposal, and Shade Tree Care & Maintenance.

Also available "The Community Environmental Inventory" and "The School Site in Environmental Education."

THE CEMETERY AS A SOCIAL DOCUMENT  Environmental Science Center.

Suggested in this unit is a series of activities dealing both directly and indirectly with the cemetery as a primary source of social information. Activities include photography, gravestone rubbings, collection of data regarding nationality, religion, age at death, economic change, technological change, and the like, including speculation on the future and cemeteries. See The Local Community: A Handbook for Teachers cited later in this section under the High School Geography Project for more possibilities for this study.


A K-12 multidisciplinary program with a problem-solving approach. This conceptual scheme is a framework in which existing courses of study can continue to be used and in which new material can be adapted. (See "Sourcebook for Population-Environment Studies" cited in Bibliographies section).

A CURRICULUM ACTIVITIES GUIDE TO WATER POLLUTION AND ENVIRONMENTAL STUDIES Institute for Environmental Education.

This is the outgrowth of a project started at the Tilton School, Tilton, New Hampshire. As stated in the introduction to the guide, "There is a desire on the part of students today to be directly involved in their society." This program is intended at least to both answer and capitalize on that desire. As one student remarked: "You actually learn by going out and doing what you are learning in theory, which is something I never did before." Thus the guide is primarily activity oriented. It is concerned with only one aspect of the environment - water pollution. But the students soon discover that this problem is multi-faceted. The social and political as well as the scientific aspects of the problem are emphasized so that activities include all departments of the school. In addition to carefully outlined activities there are lengthy bibliographies and several detailed appendices on all aspects of implementing this curriculum.


This program provides an interdisciplinary approach to earth science which weaves the various disciplines together to provide a comprehensive view of the planet earth and its
A series of investigations provide the student with the experience to better understand the content. The main difference between this and earlier efforts is the interdisciplinary treatment and the investigative nature of the approach. Objectives are stated in the ESCP Teacher Guide and in ESCP Newsletters.

SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS:
Astronomy, meteorology, geology, oceanography, geography, environmental studies. Grade level: grades 8-10 depending on ability, level of students, can be used with low ability students if investigations are the primary classroom activity. Textbook primarily designed for average and above average students in the 13-15 age bracket.

ENVIRONMENTAL DISPLAYS National Audubon Society.
This pamphlet gives suggestions for constructing various types of exhibits and serves as a springboard for further research on the topic. Request their catalog of excellent teaching aids.

Teachers have long utilized the mass media as a vehicle of instruction. This article suggests ways the mass media can be used to inculcate an ecological conscience.

ENVIRONMENTAL STUDIES PACKETS American Geological Institute.
This curriculum project has developed some truly innovative approaches to learning. The focus is on students and the creation of a learning environment of trust. The materials are published in packets of "idea cards" with some very simple but inviting suggestions for action (most outside of the classroom). If you want a truly fresh (and maybe way-out) approach, write for these cards. They are written for teachers and have been used at many grade levels.

A colorfully illustrated, paper bound series of interdisciplinary environmental studies. The investigations suggested in the series will serve as starting points for students, who will then wish to pursue individual interests in more depth.
Some of the titles: Miniclimates, Pollution, Ecology, Mapping, Small Places, Your Senses. Easy reading

This is a board game for two, three or four players. The game deals with some of the key processes by which species survive and evolve, or become extinct: reproduction, migration, mortality, competition, predation, and genetic change. It also illustrates the complex and sometimes devastating chain reactions which may be started by changes in the environment, particularly those caused by man. Teachers may request the excellent teacher's guide. There are many
possibilities for adaptations and variations to fit the teacher's particular purposes.


This booklet contains brief statements by six educators and population specialists on the need for curriculum revision, ways of incorporating the topic of population into the existing courses and strategies for arousing school interest in the population crisis. Included is a bibliography of selected books, pamphlets, and films on population and family planning.

FIELD APPROACH TO COASTAL ECOLOGY Regional Marine Science Project.

This is one unit in a series on oceanography developed in a Title III project. All the materials take an ecological approach to nature, stressing the ties between culture, economy and resource use. Field work is an integral part of the curriculum.

FIELD STUDY MANUAl FOR OUTDOOR LEARNING Millikin, Margaret et al Burgess, 1969.

A manual of activities for studying natural resources. The first section deals with mapping and field study area. The following sections detail activities in the study of soil, water, plants, animal life and weather. Another useful manual, with some keys not found elsewhere, is Game Biology and Game Management by H.J. Stains. Burgess, 1962.


A sampling of programs which social studies teachers will find provocative. Detailed comments on projects for elementary and secondary levels followed by a bibliography.

HIGH SCHOOL GEOGRAPHY PROJECT Association of American Geographers.

A year long course made up of six units with complete teaching materials - student resources, workbooks, teacher's guides, filmstrips, phonograph records, transparencies, maps, air photos, games.

In particular teachers interested in environmental subject matter will want to consult the "Habitat & Resources" unit and selected activities in the "Geography of Cities" and "Manufacturing and Agriculture" units.

FROM GEOGRAPHIC DISCIPLINE TO INQUIRING STUDENT is the final report on the High School Geography Project. This covers the work of the project since its inception in 1961. The appendices are particularly valuable for an overview of the project content.

THE LOCAL COMMUNITY: A HANDBOOK FOR TEACHERS Macmillan, 1971. Last official publication of HSGP. This handbook
is a reference and guidebook for teachers that includes many teaching and learning suggestions using the local area as the prime resource. The handbook has four sections: 1) Relating geographic concepts to the local community; 2) Preparing to teach about the local community; 3) Classroom activities and 4) Selected bibliography. Included are a series of thirteen inquiry-oriented activities about the local community and almost all are examples from actual local areas. How To Use Local History, a pamphlet from N.E.A., would be a useful addition.

Another interesting pamphlet, **ENVIRONMENTAL GEOLOGY IN TOWNE & COUNTRY** by W.C. Hayes & J.D. Vineyard, opens up a rapidly expanding facet of geology that could be used in conjunction with H.S.G.P. It is available from Missouri Geological Survey & Water Resources, Rolla, Mo.

**IMPROVE YOUR ENVIRONMENT: FIGHT POLLUTION WITH PICTURES**
(#AC-26) Eastman Kodak Company

Suggestions for a variety of photographic environmental-action projects. Excellent colored illustrations.

**INTRODUCING THE WORLD POPULATION CRISIS TO SECONDARY SOCIAL STUDIES CLASSES: AN INQUIRY-ORIENTED INSTRUCTIONAL STRATEGY**

Randall C. Anderson, Social Education January, 1970 Vol. 34, No. 1

"Classroom discussion of the global population crisis must be organized around two sharply contrasting themes: one of almost unrivaled dangers; the other, of new optimism that the problems may be resolved during the remainder of this century." The author lists "Assumptions for student Inquiry" on many aspects of these two contrasting themes and gives information and resources for student use.

**INVITING INVOLVEMENT WITH HISTORY**

Conservation & Environmental Science Center, N.J.

History lessons come alive as students are involved in direct personal experiences. All manner of possibilities here for interdisciplinary studies.

This Center has produced several other excellent units.

**THE LAND USE GAME**


LAND USE confronts students with an actual problem of trying to provide for human needs while preserving environmental values to the greatest extent possible. Student planning groups have an opportunity to test their own value judgments in a "contest" with environmental facts. A separate teaching guide suggests game variations and discussion possibilities. An outstanding simulation game at a very reasonable price.

SACRIFICE, also produced by Education Ventures, is a slightly more advanced game designed to help players anticipate, understand and deal with conflicts that often arise as methods are proposed to deal with environmental problems.

A new series of texts, now in the process of being published, for junior and senior high school. Interesting selections, lively writings, and attractive format! Send for the descriptive material and immediately you will see the many exciting possibilities for environmental education.

MAN AND HIS ENVIRONMENT: AN INTRODUCTION TO USING ENVIRONMENTAL STUDY AREAS  Association of Classroom Teachers, NEA 1970.

A new interdisciplinary approach to environmental education at all school levels. It provides practical suggestions for classroom teachers for use of the environment to help students understand relationships between man and his environment. A unique aspect of this approach is the utilization of five "strands" which can be applied to any subject area. A filmstrip, also entitled MAN & HIS ENVIRONMENT, will orient administrators, teachers, and the public to this strand approach.


Final version of a basic junior high science text developed by The Educational Research Council of America. This program is suitable for a wide range of abilities and grades. The four problem-centered units offer flexible, open-ended investigations from which a teacher could draw many good ideas.


Describes ways to build balanced ecosystems within the classroom using low-cost materials.

OUR MAN-MADE ENVIRONMENT - BOOK SEVEN  Group for Environmental Education (GEE)

A most unusual and exciting text-workbook that is an introduction to the study of the Man-Made Environment. It poses four basic questions - 1) What is the man-made environment? 2) Why do we build our environment? 3) What determines the form of our environment? 4) How do we change our man-made environment? Several different kinds of problems are proposed for students to work through, some by discussion and some by constructing various forms and buildings included in punch-out form. The book emphasizes that there are no right and wrong answers, only choices for the student to make depending on the way he sees his world or want it to be.

The basic ideas and techniques of this program can be expanded as the advance student studies urban areas using the High School Geography Project or becomes involved in community projects such as DOING GERMANTOWN (this & HSGP annotated in this section). The art student will also find
this book stimulating.

GEE has other programs underway that will soon be in print.

The 1971 spring issue of DESIGN QUARTERLY, available from MIT Press is entitled MAKING THE CITY OBSERVABLE. It is a rich source of ideas on urban environmental education.

A different aspect of design, explored in Sommer Personal Space (cited in the Book section) can be introduced as students expand their study of the Man-Made Environment.

POPULATION REFERENCE BUREAU

POPULATION BULLETIN

WORLD POPULATION DATA SHEETS

POPULATION PROFILES

P.R.B. is the best source of information on facts about size, composition and dynamics of the world's population and analyses of the impact of these demographic facts on the quality of human life throughout the world. Membership is only $5.00 for teachers and all members receive all regular P.R.B. publications.

PROBING THE NATURAL WORLD ISCS Level 3 Silver Burdett, 1972.

This is the ninth grade volume in the sequential junior high series developed by the Intermediate Science Curriculum Study Program. The section entitled "Environmental Crisis" is of particular interest. The "investigations" will spark both student and teacher.

PROGRAMS IN ENVIRONMENTAL EDUCATION National Science Teachers' Association.

Describes over 50 programs in schools around the country. Programs include all formats and grade levels. Only programs now underway and able to distribute materials and/or information have been included.

RESOURCE UNIT ON POPULATION PRESSURE Baltimore City Public Schools, Bureau of Publications, Baltimore.

A Teacher's guide for the teachers of the Baltimore Public Schools at all levels. The pamphlet attempts to alert teachers to population pressure at local to international levels. Background information is presented, suggested approaches given, and a bibliography of instructional materials is included.

SMEAC/SCIENCE, MATHEMATICS AND ENVIRONMENTAL EDUCATION ANALYSIS CENTER ERIC: HOW TO USE IT FOR ENVIRONMENTAL EDUCATION

Request this report from SMEAC to obtain complete information on the retrieval of reports, curriculum guides, journal articles, etc. on environmental education. The newsletters from these Clearinghouses are good and leads to new materials for the school librarian and curriculum planner.

This issue of the NCSS journal is entirely devoted to The Environmental Crisis and incorporates an interdisciplinary approach. Also includes a lengthy, multi-media bibliography.


This issue is devoted to population education and contains the widest multi-media coverage yet given to this topic. This journal should certainly be available to teachers in the school's professional library.

**TEACHING SCIENCE WITH GARBAGE** A. & V. Schatz Rodale, 1971.

An interdisciplinary approach that includes mathematics, science and social studies. The materials needed are simple, inexpensive, readily available, and familiar. The activities offer a positive approach to the study of pollution. Write for information on new units soon to be published.

**THERE IS NO "AWAY": READINGS AND LANGUAGE ACTIVITIES IN ECOLOGY** Roloff & Wylder Glencoe Press, 1971.

This book has two stated purposes - first to make the student aware of the current environmental crisis; second to help students learn to communicate better, especially by way of language. In this area of suggested communication activities the teacher will find many workable suggestions.


ConTours is an open-ended series of study guides which can be used in a class situation and is also particularly good for individualized or small group investigations. There are four titles available: A Guide to the Study of Freshwater Ecology; Environmental Pollution, . . . Soil Ecology, . . . Terrestrial Ecology. Suggestions for further research and a reading list are included at the end of each investigation.
BEARGRASS CREEK color 19 mins. Stuart-Finley Productions.
This story of a stream is the story of many polluted waterways in our country. The road from clean water to polluted water is only a short distance in time and effort. It is much longer and more difficult to reverse the direction.

CONSERVATION AND BALANCE IN NATURE color 13 mins. International Film Bureau.
The word "ecology" has become almost a household term without most persons knowing what it means. The film relates, through easily understood examples taken directly from nature, what ecology is. It also examines man's role in affecting balances in biological communities.

Tells how man has changed and spoiled his environment through the waste of natural resources and the pollution of air and water. Suggests ways of preserving the resources.

Man first struggled to survive in a hostile environment. Now that he has survived in it, he is fast destroying the very environment upon which his life depends. Slow start, but otherwise very useful film.

Our growing problem of vandalism and littering is a national disgrace. Each one of us can help correct this situation. This film gives the youngsters some ideas on how this can be done.

Man is rapidly destroying his natural environment and there is an end to our natural resources. Is urbanization worth losing all our natural areas? Can anything be done about it?

POPULATION ECOLOGY color 19 mins. McGraw-Hill
Populations of plants and animals including humans have natural limits that are set by the environment in which they live. There are many factors which affect population and their interactions are complex.

A STRAND BREAKS color 15 mins. Encyclopedia Britannica.
The natural balance of the living community is usually maintained by the interrelationships of all its inhabitants. Man, however, through ignorance and self-interest, often upsets this balance and suffers the drastic results. Emphasizes that man must intelligently manage his environments.
THE STRAND GROWS  color 15 mins. Encyclopedia Britannica.
Each life - plant or animal - is like a tiny strand in a vast web that binds all living things together, each life having its effect on other lives. Shows how some die out while others develop. Emphasizes importance of a balance in nature.

The ever-increasing problem of solid waste disposal is discussed along with related air and water pollution sources. Some of the new techniques of solid waste management are demonstrated.

TRAGEDY OF THE COMMONS color 26 mins. King Screen Productions.
This film on issues of population is a classroom version of Garrett Hardin's article of the same title in the December 13, 1969 issue of Science. Tragedy of the Commons draws an illustration from 18th century England where farmers shared the benefits of a mutual pasture for their animals. Profit motive competed with limited space, and the commons failed. The film goes on to develop the analogy between the destruction of the commons and our current dilemma of rapidly diminishing resources, overcrowding, and stress on a finite earth.

WATER AND LIFE color 15 mins. Bailey Film Associates.
Water is important to all living things. Its physical characteristics make it the ideal medium for transport of food and waste products between cells. Describes evolutionary changes as plants and animals left the water to live on land.
FILMSTRIPS
Grade 7 - Grade 9

AIR POLLUTION AND YOU Current Affairs Films, 47 frames, silent, color.
An up-to-date presentation on how, what, and where air pollution is and how it affects all of us. Photography, graphs and current facts add to this film's usefulness. The questions and ideas for further investigation are very good.

CONSERVATION FOR TODAY'S AMERICA Society for Visual Education, sound, color.
Series Titles: Soil Conservation Today, Forest Conservation Today, Water Conservation Today, Wildlife Conservation Today, Mineral Conservation Today, Urban Conservation Today, Land Conservation Today. This series deals with the need for the conservation of our natural resources and analyzes the problems arising from that need. Some solutions are given which should generate group discussion and further study. Good photography. Can be used at all levels if adapted to group. Each film might be used as a course introduction.


ECOLOGY AND MAN Set I, McGraw-Hill, silent, color.
Series Titles: Introduction to Ecology, Changes in Ecosystems, Energy Relationships, Habitats and Niches, Populations and Biomes, Adaptations to Environment. This series introduces basic ecological principles and vocabulary and each film develops in sequence a major concept. Excellent color, good questions for discussion. They may be adapted for use according to ability. Supplementary information and explanation by user is necessary.

Series Titles: The Forest Biome - Part I & Part II, The Grassland Biome, The Desert Biome, Freshwater Ecology, Seacoast Ecology. This series shows how the basic ecological principles operate in the major biomes and habitats. Prior knowledge of concepts and terminology is necessary for use of these films. The color is excellent, good discussion material adaptable according to ability.

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Ecological theory and practice are graphically demonstrated through the investigation of a specific problem: Why were the Bighorn Sheep of Idaho mysteriously declining?

ENVIRONMENT: CHANGING MAN'S VALUES Guidance Associates Sound, color.

Part I explores the individual's relationship to environmental issues; as part of the problem and the solution. Part II discusses the possible role of government and private institutions in combating environmental decay. The series stresses that individual values and activities must be changed to improve the quality of life. Detailed teacher's guide.

ENVIRONMENTAL CRISIS: WHAT THE INDIVIDUAL CAN DO National Education Association Sound, color.

A call to constructive action from the Student N.E.A. The filmstrip can be a starting point for a mini-course on the environment, for a program of field activities, or for some other kind of commitment to action. A leaflet of the same title is available in quantity at bulk rates. This is a checklist and resource guide.

ENVIRONMENTAL POLLUTION - OUR WORLD IN CRISIS Ward's, 64 frames, silent, color.

Series Titles: Nature of the Crisis, Atmospheric Pollution, Land Pollution, Freshwater Pollution, Marine Pollution, Pollution Control. Content of filmstrips covers subject well. Very informative, good questions should lead to discussion. Introduces references for further study. Environmental vocabulary is introduced. Some of the concepts will require additional study. Very good accompanying manual.


Series Titles: The Rivers Must Not Die, The Land and the Soil, Solid Waste, Air Pollution, Noise—the Latest Pollution, Pests, Pesticides and People.

Each filmstrip scrutinizes one major environmental problem in a thoughtful, unhysterical manner. The filmstrips and accompanying leader's guide suggest specific and meaningful activities for students to help combat pollution in their own communities. Dr. William Stapp, one of the best known environmental educators, served as an advisor in
the production of this series.

EXPLORING THE WORLD OF NATURE S.V.E. Silent, color.

Series Titles - Group I: Let's Explore a Field . . . a Lawn . . . a Pond . . . a Stream . . . a Woodland.

Series Titles - Group II: Let's Explore the City, Part I & Part II, Let's Explore the Dunes, . . . the Desert, . . . the Shore, . . . a Salt Marsh. Introducing a variety of plants and animals in their natural setting and their relationship to their environment. Vocabulary level consistent—good questions and ideas for further exploration. Useful prior to field trips, as an introduction to study of plants and animals, or discussion.


Part I demonstrates through such examples as the death of Lake Erie and the Santa Barbara oil spill, the catastrophic dangers of environmental pollution. Part II outlines ways to avoid the destruction of our environment. Detailed Teacher's guide.

MODERN BIOLOGY: ENVIRONMENT AND SURVIVAL S.V.E. Silent, color.

Series Titles - Group II: Life in a Sand Dune Succession, Life in a Bog, Life in an Alpine Environment, Life in a Fallen Log. Micro-community. Explains animal-environmental interdependence, plant/animal communities, importance of biotic and abiotic conditions. This group is of particular value because of the unusual communities which it includes.

NATURE'S HALF ACRE Encyclopedia Britannica Silent, color.

Some plants and animals that may be found in a small area. Excellent photography shows beauty of nature. Can be used as a part of nature study unit or as introduction to field trip.


Part I defines the scope of the world population explosion and outlines its consequences. Part II describes measures now underway to control the population explosion. Students see efforts to develop fish-based foods and miracle grain crops and consider the work of the United Nations in this area. Detailed Teacher's guide.

PLANT AND ANIMAL RELATIONSHIPS Encyclopedia Britannica Silent, color.


These filmstrips present two basic ideas: that all organisms are part of interdependent living systems called
communities and that they are especially adapted to their particular environment. The charts and diagrams are very useable and the suggestions for further study and discussion very good.

**SMALL WORLDS OF LIFE** National Geographic Sound, color.

These will be available in September, 1972. Pictures are taken from National Geographic's great collection. Natural sound effects are used wherever possible. A most exciting introduction to the study of ecological communities.

**SQUANDERED RESOURCES** New York Times, Book & Education Div.
Sound, black and white.

This filmstrip presents a historical summary of the use and misuse of resource needs and resource potentials. The sound-filmstrip provides appropriate breaks for discussion and the manual offers helpful background reading and bibliography. However, the 71-frame presentation is lengthy and contains much information. It should probably be divided for use in two successive classroom sessions.

**THIS UNIQUE PIT OF LIFE** Guidance Associates Sound, color.
The American Forest Institute developed this filmstrip. It is a general introduction to the ways in which trees affect our environment, touching upon both their aesthetic and economic importance as well as giving botanical facts.

**TOPICS IN ECOLOGY** Multi-Media Productions Sound, color.
Series Titles: What is Ecology, What is Pollution What is Air Pollution, The Automobile Beyond Pollution, Prosperity-Pollution. This series gets at men's attitudes and value-priorities which have caused today's ecological disasters. The excellent, contemporary photography is realistic and the narration poses many questions for class discussion.

**YOUNG SCIENTISTS INVESTIGATE POLLUTION** S.V.E. Sound, color.
Series Titles: Smog & Plant Growth, Air Pollution and Lung Tissue, Measuring Water Pollution, Fresh Water from the Sea.

This series presents an unusual approach to the study of atmospheric and water pollution. Students tell of their science fair projects. Offers opportunities for discussion of content and procedures.

**THE WISDOM OF WILDERNESS** Guidance Associates Sound, color
As a technological pioneer . . . and a naturalist-conservationist, raised by the conflict between technological expansion and the drive to preserve natural lands. Detailed Teacher's guide.
AUDUBON NATURE CHARTS  National Audubon Society
A wide selection of both four-color and one-color wall
charts on a variety of natural history subjects. Write for
catalog.

CLEAN THE SCENE  Eastman Kodak
A photo display kit which contains a set of color and
black-and-white enlargements of pictures in the Kodak publi-
cation "Improve Your Environment - Fight Pollution with Pic-
tures." Offers an excellent way to earn money for a club or
school project.

CONSERVATION AND FULL UTILIZATION OF WATER  Superintendent
This chart illustrates the various methods used to con-
serve and utilize water. Available in two sizes - 23" x 16"
and 67" x 38".

CONSERVATION POSTER SET  J. Weston Walch, Publisher.
Each poster carries a large illustration and a thought-
provoking commentary. Posters in each set are coordinated
to give a survey of the area under study. 18 posters per
set, 11" x 14". The sets include such titles as Ecology of
the City, Conservation of Wildlife, Air Pollution.

ENVIRONMENTAL EDUCATION CHARTS  Gull Lake Environmental Edu-
cation Project.
Illustrations and text describing food, habitat, distribu-
tion, reproductive and annual cycles, distinguishing charac-
teristics and identification of several different animals.
Also a pond life chart depicting food chains and energy
cycle.

ENVIRONMENTAL EDUCATION: PICTURES THAT TEACH  N.E.E.D.
This packet of twelve 15½" x 23" boards, printed on
both sides in full color, uses actual photographs to cover
both the positive and negative aspects of the environment.
Included are examples of urban and suburban ecology and of
land, water and air pollution. The accompanying detailed
Teacher's guide presents learning strands developed especial-
ly to be interdisciplinary.

HISTORIC STAMP POSTERS  U.S. Postal Service, Washington, D.C.
A full color, 30" x 40", poster of nine of the conserv-
vation stamp series could become the focus for a stamp col-
clection display in connection with an interdisciplinary
environmental educational project.

HOW MAN POLLUTES HIS WORLD  National Geographic December
1970.
Colorful painting 42½" x 29½" (order from National
Geographic, Dept. 61) depicts many sources of man-made pollution.

HENRY GIBSON ECOLOGY POSTERS Synergisms.
Six colorful 2' x 3' posters that will delight Henry Gibson admirers. Also puts across a worthwhile message on eco-pollution. Students will have suggestions for many other posters.

LIFE EDUCATIONAL REPRINTS Life Education Program.
The editors of Life have reprinted many of the pictorial essays for use in schools. The series from the World We Live In is an excellent source of pictures for ecological studies at any grade level.

POPULATION POSTER PACKET Population Institute.
This packet is the result of a graphics contest run by the Population Institute Student Project. It contains six colorful pieces of student artwork.

STUDY PRINTS Society for Visual Education.
These are 18" x 13" colored prints on heavy stock. The set entitled GEOGRAPHY FROM SPACE is most interesting would be useful in any secondary course in Earth Science or Astronomy. The NASA publication Ecological Surveys from Space also fits in well here.
MAGAZINES AND NEWSLETTERS
Grade 7 - Grade 9

AMERICAN FORESTS American Forestry Association, 919 17th
Street, L.W., Washington, D.C. 20006.
$7.50 year subscription. Monthly, 65 pages; for the
advancement of intelligent management and use of our forests,
soil, water, and wildlife, and all other natural resources
necessary for an environment of high quality and the well-
being of all citizens.

AUDUBON National Audubon Society, 950 Third Avenue, New
York, N.Y. 10022.
$10.00 with individual membership ($2.00 single copy)
in Society "for the conservation and appreciation of wildlife
and wilderness, natural resources and natural beauty." Bim-
onthly, 130 pages noted for its excellence of material and
color photography.

CATALYST FOR ENVIRONMENTAL QUALITY 274 Madison Avenue, New
York, N.Y. 10016.
$5.00 subscription, $4.00 per year for students. Quar-
terly, 36 pages, concerned with the total environment and
aims "to help educate people to the threats to their envi-
ronmental well-being and the need for a change of attitude
to quality rather than quantity values."

CLEAR CREEK 617 Mission Street, San Francisco, California,
94105.
$5.00 year subscription. Monthly, CLEAR CREEK directs
itself to uniting vision with fact, and daily living with
universal concepts. Articles on current problems and new
life styles.

THE CONSERVATIONIST State of New York, Department of Envi-
ronmental Conservation, Albany, New York, 12201.
$2.00 year subscription, $6.00 for three years. Bi-
onthly. Contents include students' page and How-to-do-it
Series. This is probably the best magazine from a State
"Conservation Department."

CONSERVATION NEWS National Wildlife Federation, 1412 16th
Street, N.W. Washington, D.C. 20036.
Free service made possible by contributions received
for the wildlife conservation stamps. Bi-weekly, 15 pages.
National issues highlighted.

THE CURIOUS NATURALIST Massachusetts Audubon Society,
Lincoln, Massachusetts 01773.
$2.50 subscription. 9 issues per year, 16 pages, "A
magazine for beginning naturalists." Includes many excel-
 lent projects.

$5.00 with active membership in organization dedicated to the preservation of all forms of wildlife. Quarterly, 135 pages, a magazine of wildlife issues and educational articles (including predator control, endangered species, wildlife interest in Congress, extensive book reviews.)

ECOLOGY TODAY and ECOLOGY TODAY NEWSLETTER  Ecological Dimensions, Inc., P.O. Box 190, West Mystic, Conn. 06398.

$6.00 year subscription. Monthly, 43-page magazine and 6-page newsletter, alternate.

FOXFIRE  Rabun Gap, Georgia 30568.

$5.00 year. Quarterly. FOXFIRE is produced by a group of Appalachian high schoolers who wanted to know and to tell others, how their grandparents made it before the advent of modern technology. In search of a fading culture they scout the surrounding hills with cameras and tape recorders, finding senior citizens eager to relate and demonstrate mountain religion, life ways, and survival skills. With the help of the "Rabun Gap Outriders" a group of Puerto Rican students at a lower East Side high school in New York have founded a kindred journal, the Fourth I, soon to be joined by a journal by American Indian students.

H.S. POPINS  Population Institute, 100 Maryland Avenue, N.E., Washington, D.C., 20002.

A free newsletter filled with ideas for action projects, directed to the student. Solicits student graphics.


A most interesting quarterly newsletter that will alert the teacher to new ways of incorporating the Humanities into environmental education.


Free. Bi-monthly. Provides information on most recent developments in the growing effort to introduce population issues into formal school curricula, primarily at middle and secondary levels.

THE JOURNAL OF ENVIRONMENTAL EDUCATION  Dembar Educational Research Services, Box 1605, Madison, Wisconsin 53701.

$7.50 subscription, $5.00 for students, $2.00 single copy. Quarterly, 48 pages, black and white, no photographs, "Devoted to research and development in conservation communications." Vital addition to professional libraries in every school.

$7.50 with membership, $4.00 to schools, libraries and students, $1.00 single copy. Society is incorporated to secure the preservation of wilderness. Quarterly, 45 pages.

MEDIA AND METHODS 134 N. Thirteenth Street, Philadelphia, Pa., 19107.
$5.00 year. Monthly, September-May. This periodical (formerly EDUCATOR'S GUIDE TO MEDIA AND METHODS) offers sound media reviews and information, with articles that seek to startle the staid.

MOTHER EARTH NEWS P.O. Box 38, Madison, Ohio 44057.
$5.00 year subscription, $1.00 single copy. Bi-monthly, 99 pages, black and white; "edited by, and expressly for, today's influential 'hip' young adults. The creative people. The doers. The ones who make it all happen." Heavy emphasis is placed on alternative life styles, ecology, working with nature and doing more with ideas. Teachers will learn much from this.

NATIONAL GEOGRAPHIC National Geographic Society, 17th & M Streets, Washington, D.C. 20036.
$9.00 year. $1.00 single copy. Monthly. Special December, 1970 issue OUR ECOLOGICAL CRISIS, especially valuable.

$10.00 year with associate membership in organization. Bi-monthly, 55 pages, noted for many color photographs. Environmental education materials available. NWF also publishes INTERNATIONAL WILDLIFE, similar in format.

Free, bi-weekly, 6 pages, national issues covered.

$5.00 year, six per year as part of membership. Contains perceptive studies of important problems of expanding population.

POPULATION CHRONICLE Population Council, 245 Park Avenue, New York, N.Y. 10017.
Free, 4 to 6 times a year covers a broad field of population and family planning in brief, non-technical terms.

$10.00 year subscription, $5.00 for six months. Weekly coverage of health and human ecology news, 8 pages. Includes an "Eco-Action" section to get the reader directly involved.
in doing something concrete for the betterment of the environment.

$7.00 per year. Monthly September-June. The art magazine for teachers, with new ideas, latest techniques, and practical help. Articles and activities to increase students' environmental awareness.

THIS MAGAZINE IS ABOUT SCHOOLS  56 Esplanade Street East, Suite 301, Toronto 215, Ontario, Canada.
$4.00 subscription in United States, $1.00 single copy, quarterly, 160 pages. Innovative educational thought.
Bibliographies

Grades X Through XII

This bibliography of AIDS to environmental education is to help develop a recognition of present and future environmental problems and to promote the ability to formulate, and to recognize the implications of, solutions to these problems.
BIBLIOGRAPHIES
Grade 10 - Grade 12

A gold mine of information! Annotated bibliography on books, pamphlets, periodicals, films, filmstrips, loops, recordings and reals. Contemporary themes and issues. Grade level indicated.

A must for any high school library. Also an excellent resource for teachers. The first section offers general references to the subjects covered, including a list of anthologies. Second section lists books and articles.

A bibliography of curriculum materials for environmental studies. Materials were not evaluated by NSTA prior to publication. List is, however, a useful lead to much good material.

The request for materials on the American Indian is soaring. This bibliography is one good source. It includes periodicals and non-print materials.

Planned Parenthood - World Population PAPERBACKS ON POPULATION FAMILY PLANNING, AND RELATED SUBJECTS. A SELECTED BIBLIOGRAPHY FAMILY PLANNING & RELATED SUBJECTS.
Briefly annotated bibliographies. These are among several put out by Planned Parenthood-World Population, one of the best sources of informative materials for population education.

Serina Press GUIDE TO FILMS (16mm) ABOUT ECOLOGY, ADAPTATION AND POLLUTION.
The guide provides brief descriptions of 16mm films available from 28 producers, distributors, and university audio-visual media centers. Obviously not complete, this booklet nonetheless is an excellent source.

Scholastic Teacher SURVIVAL GUIDE TO ENVIRONMENTAL EDUCATION October, 1971.
Annotated multi-media bibliography.

Twelker, Paul A. BASIC REFERENCE SHELF ON SIMULATION AND GAMING Series One Paper from ERIC at Stanford, June 1970.
A lead to books, bibliographies, professional organizations, centers of activity, journals and newsletters, in the field of simulation and gaming.
U.S. Department of Health, Education and Welfare FREE FILMS ON AIR POLLUTION.

Annotated bibliography of 16mm films available from H.E.W.


An annotated bibliography that covers books, reports and articles pertaining to problems of environmental degradation in American cities and settled communities. Bibliographies are listed at the end of each section to enable users to pursue their particular interests. Germane films, periodicals and organizations are included to provide supplementary sources of information or guidance. Valuable source for use with the High School Geography Project GEOGRAPHY IN AN URBAN AGE.

U.S. Department of Interior CONSERVATION AND ENVIRONMENT FILMS AND RELATED NATURAL RESOURCE FILM SUBJECTS.

Briefly annotated list of 16mm color, sound films available from various branches of the Federal Government.


An annotated bibliography of selected environmental publications of the executive branch of the Federal Government.


A listing of 115 items - books, reports, journal articles, etc. Not annotated. This Center is also a good source of curriculum materials.
BOOKS
Grade 10 - Grade 12

Exciting alternatives in playground design. Offering
the variety, adventure and fantasy opportunities of play in
the countryside to city children, looked after by teenage
playleaders. This is an area in which high school students
could be very effective. See also Seymour SMALL URBAN
SPACES cited later in this list.

American Universities Fieldstaff THE IMPACT OF POPULATION
PROBLEMS ON SOCIETY AUP, 1971.
These ten booklets go beyond demographic concern with
populations size, density, distribution, and vital statistics to examine the social concomitants of population trends,
the interplay between attitudes and a variety of institutional arrangements which accompany population changes.
Problems are considered in the Philippines, Yugoslavia,
Malawi, Brazil, Japan, Bolivia, Singapore, Afghanistan, and
Kenya. A Teacher's guide is also available which discusses
the relationship between the data presented in each title
and their significance to the over-all theme of the series.

This is one volume in the series OUR LIVING WORLD OF
NATURE. Each book deals with an American biome, such as the
Forest, the seashore, or the desert, and leads the reader to
an understanding of interrelationships within the biome.
Written in an easy-to-follow lively style. The illustrations, charts and diagrams aid greatly in making this a most
useful reference set. In the appendix of each of these books
you will find a glossary, a bibliography, guides to identifi-
cation, and ideas for science activities. A Teacher's
guide is available.

Andrewartha, H.G. INTRODUCTION TO THE STUDY OF ANIMAL POPU-
An advanced compact text on the theory and the practice
(lab and field exercises) of animal population studies.
Many good ideas for approaching population studies.
Further reading: Allee, W.C. PRINCIPLES OF ANIMAL
ECOLOGY Saunders, 1949. Section on "Population Factors and
Selected Population Problems" is a good source for creating
case studies and lab and field investigations. Slobodkin,
L.B. GROWTH AND REGULATION OF ANIMAL POPULATIONS.

Barr, Robert D ed. VALUES AND YOUTH (Crisis Series No.2)
"Kaleidoscopic View of the moods, moda, and meanings
of youth activities in contemporary America." Specific
teaching strategies that will help every teacher are outlined.

Emphasizes the interaction and interdependence of all things with each other and with their environment. Points up the biological analogy between the forest and the sea.

Blake, Peter GOD'S OWN JUNKYARD Holt, 1964.

Excellent illustrations and vigorous reading on the "Planned deterioration of America's landscape." Contrasting examples of deterioration and beauty in towns, along roads, in the sky, are introduced by brief essays, illustrated with numerous photographs and highlighted with quotations. Can be used in conjunction with discussions on almost any environmental problem. Excellent suggestions for local projects depicting pollution will be found in IMPROVE YOUR ENVIRONMENT listed in Curriculm, Materials section.


A well-organized text that provides basic concepts and approaches to biological studies in outdoor settings. Three parts cover (1) concepts (2) techniques, observing natural resources, recording data, collecting and experimenting (3) responsibilities, protecting the land, and use of campus and schoolgrounds. A bibliography arranged by chapters provides a wealth of additional sources. Teachers will find it a useful resource at all levels.


A brief introduction to animal population study dealing with experimentally tested concepts. The emphasis is on how the environment influences populations and maintains a balance of populations in the living community. See also Andrewartha in this section.

Buchbaum, Ralph and Mildred BASIC ECOLOGY Boxwood, 1957.

As the title indicates, a basic introduction to ecology for beginners in the field. Useful bibliography that includes journals and textbooks as well as titles under special aspects of ecology.


An excellent book in the PATTERNS OF LIFE Series written in a clear style and with a fine selection of graphs, charts and photos.


The authors use the case method to explore systematically the relationship between the carrying capacities of particular
environments and the populations they support and to show how changes in population are affected by changes in other variables: environment, technology, social organizations and idealogy. An annotated bibliography of more than 300 entries includes some to theoretical works. Visual aids are reviewed and techniques for their interpretation and construction are included. See HIGH SCHOOL GEOGRAPHY PROJECT annotated in Curriculum Materials Section.

Christensen, J.A. HONEST INJUN MEDIA AND METHODS October, 1971.

The unfortunate title of this article should not prevent the reader from looking it up because it is an excellent source of material on the American Indian. As more and more people come to see the merits and beauty of the Indians' philosophy in regard to nature, teachers should be prepared to use literature by, and about the Indian. See also La Farge LAUGHING BOY cited later in this list.

Congressional Hearings, Miscellaneous. House Committee on the Merchant Marine and Fisheries, HEARINGS ON THE HUDSON RIVER EXPRESSWAY, EFFECTS ON FISH AND WILDLIFE.

Senate Committee on Interior and Insular Affairs, HEARINGS ON THE EVERGLADES NATIONAL PARK.

Congressional committee hearing transcripts are distributed free of charge to the public. They may be obtained by writing to the appropriate committee.

At a congressional hearing, proponents of diverse public viewpoints have their day in court.

The Hudson River and Everglades hearings are outstanding both for the liveliness of the debate, and the landmark decisions in conservation history which they pertain to. Both are excellent sources for teaching students about politics, environmental ethics, and how to present highly technical information to a group of nonspecialist and often cantankerous people who probably don't support your view.

The bi-weekly CONSERVATION REPORT, distributed free of charge by the National Wildlife Federation (see listing under NWF in this index) will alert the reader to other hearings on the environment.


This booklet describes how and why world population is growing and the effects on industrial nations as well as "the other two-thirds" of the world's people and some means of coping with the problem. Its graphs, vocabulary, style and general format will appeal to those high school students with limited reading ability.

CONGRESS AND THE ENVIRONMENT is the result of a graduate seminar at the University of Washington on the special impact of government decisions and laws on various regional and national environmental quality problems. Each chapter is concerned with a piece of congressional legislation and analyzes its effectiveness in dealing with an environmental problem. The case studies should provide useful materials for teachers preparing environmental quality units at various levels.

Council on Environmental Quality (C.E.Q.) 102 Monitor 722 Jackson Place, N.W., Washington, D.C. 20006

C.E.Q. briefly describes and tells where to send for free copies of the latest impact statements. (Also called "102" statements are, for the most part, non-technical and highly readable. Statements are routinely prepared for small local roads, dams, and bridges as well as for larger developments like nuclear power plants, the Alaskan pipeline and the oil drilling works in the Gulf of Mexico. Students may wish to critically review "102" statements submitted for nearby developments they have studied in class. Whether they want to receive a practical political education, or learn to write better laws, the 102 MONITOR and the statements will prove useful to high school students and teachers.

Court decisions, miscellaneous.


"Scenic Hudson Preservation Conference vs. F.P.C." (354 F.2d CA 2 1965) cert. denied, 384 U.S. 911 (1966)

These and other court decisions provide insight into the final sequences of environmental laws. Some laws are interpreted by the courts to be stronger than Congress probably intended them to be, other acts of Congress lose out in the courts. Students may learn how to write laws with fewer loopholes, laws which truly protect the environment, by examining appropriate judicial decisions.

Decisions for all cases which reach a court of appeals are printed in regional "reporters", available in any law library. Any reader abreast of vital forthcoming decisions.


With the exception of several essays which the reader may wish to bypass, this volume has several valuable characteristics not to be found in other anthologies (e.g. Ewald, Nash and Thomas) with which it should be used.

A strong series of articles on economics (by Boulding, Fisher & others), includes a thoughtful article by Marion Clawson on the economics and environmental impacts of increasing leisure activity.
Other unique articles are those on the restoration of lost and degraded habitats, and on the perpetuation of cultural patrimony into urban planning.

Davies, Delwyn FRESH WATER Natural History Press, 1969.
Description of the special chemical and physical properties that account for water's dominant position in the living world and the relevance of these properties to man's own physiological processes. Excellent illustrations. This offers a global view as do the other volumes in the NATURE AND SCIENCE LIBRARY.

An elementary, instructive and readable account of pollution control from the viewpoint of a political scientist. Would fit in well with work students using the Tilton Water Pollution Project A CURRICULUM ACTIVITIES GUIDE TO WATER POLLUTION AND ENVIRONMENTAL STUDIES (see Curriculum Materials section). Students would receive a good introduction to the politics of water pollution control as well as to water conservation and management problems by reading the following:
- Peterson, Elmer T. BIG DAM POOLISHNESS Devin Adair, 1954.

DeBell, Garrett ed. ENVIRONMENTAL HANDBOOK Ballantine, 1970.
About four-fifths of the handbook deals with the "Meaning of Ecology" and consists of thirty-one readings which "explore the nature of some of the causes and some of the possible solutions to the major problems in the environmental crisis." The remaining portion has two short sections "Eco-Tactics: Individual Action" and "Eco-Tactics: Political Actions." Good list of films and a bibliography.

Teachers will find the handbook useful for supplementary reading, for generating class discussion, or for arousing interest in individual or group reports on specific environmental problems. Ballantine Books has published The Voter's Guide to Environmental Politics by DeBell and THE USER'S GUIDE TO THE PROTECTION OF THE ENVIRONMENT by Swatek. These enlarge upon the similar sections in the Handbook.

Another book along the same lines is "Eco-Tactics - The Sierra Club Handbook for Environmental Activists" published by Pocket Books.

A well-chosen anthology which considers the scientific,
sociological and political aspects of our present ecological values. To be read in conjunction with Metcalf's VALUES EDUCATION.


CONSERVATION OF NATURE brings to young people an awareness and understanding of current problems in the preservation of the fitness of our natural resources. Nature is here thought of in the broadest sense, encompassing all living things, as well as land, sea, air, water and even the modification of landscapes effected by man over centuries of settlement and agricultural use. Excellent photographs from international sources serve to indicate vividly the global aspects of the concern for the preservation of our natural resources.

Further reading: J.A. Lauwery's MAN'S IMPACT ON NATURE Natural History Press, 1970.


Comprehensive analysis, taken from a broad ecological approach, of world wide population growth with resulting demands on food and other resources. The bibliographies at the end of each chapter add greatly to the value of this reference. A Teacher's Guide is also available upon request from W.H. Freeman Company.

Elder, Frederick CRISIS IN EDEN Abingdon, 1970.

The Christian-Judiac tradition has often been accused of supplying moral absolution and praise to environmental destroyers. In the light of these accusations, the author, a young Christian theologian examines the question, "Can a person be a good Christian and a good environmentalist?" He draws skillfully from the writings of Christian theologians, paleontologists, biologists and other scholars to argue, "YES."

#2 A NEW ETHNIC FOR A NEW EARTH, Friendship Press, 1971.
Hamilton, Michael THIS LITTLE PLANET (annotated on this list)

ENVIRONMENTAL WORKBOOKS Scientists' Institute for Public Information.

Clear, explicit, and authoritative, each one outlines and discusses a basic problem of the environment; airs alternatives and solutions; gives examples of citizen action taken;
offers further resources in a selected bibliography.

Titles: AIR POLLUTION, WATER POLLUTION, HUNGER ENVIRONMENTAL EFFECTS OF WEAPONS TECHNOLOGY, ENVIRONMENTAL COST OF ELECTRIC POWER, NUCLEAR EXPLOSIVES IN PEACE TIME and PESTICIDES.


Two of the most imaginative environmental anthologies. Papers in the "Change" volume attempt to formulate policies for coping with inevitable technological changes that will affect the physical environment. The "Policy" volume offers dialogue on recommendations to implement the philosophies and concepts expressed in the other volume.


DIMENSIONS OF CHANGE describes a collision course between what we are and what we could be. The time span is the next thirty years.

Quotations, illustrations, ideas, the entire format set this book apart. Even the most jaded of readers will find something to spark him.

An earlier book by Don Fabun DYNAMICS OF CHANGE, Prentice-Hall, 1967 is equally intriguing. Both these books have an air of science fiction about them that would tie in well with a unit on that subject.

Farb, Peter and the Editors of Life ECOLOGY Time, 1963.

Excellent introduction to ecology covering all aspects of plant-animal-man relationships. Final chapter deals briefly with historic attitudes toward ecological concepts and current awareness of need for conservation measures. Many full-page illustrations throughout make this useful for browsing for all age groups. A map and descriptive notes of the major biomes of the world appear at the end of the text. Also a bibliography with classified entries. The other volumes in this Life Nature Library are a valuable addition to any classroom.


This is a survey of two-year, post-high school programs related to ecology. Possibilities here for high school work-study programs. As students are studying environmental problems in the classroom, they should be alerted to the careers open to them in these problem areas.

Further reading: Fanning OPPORTUNITIES IN ENVIRONMENTAL CAREERS

Paradis RECLAIMING THE EARTH: JOBS THAT HELP IMPROVE THE ENVIRONMENT

Munzer PLANNING OUR TOWN (cited further on)
Foreign Policy Association Inc. **HEADLINE SERIES - THE POPULATION EXPLOSION** No. 120, 1956.

Many interesting ideas in this overview are clearly expressed in graphs, charts and maps. Discussion questions in eight areas are presented and references included. No. 174, 1965. **WORLD POPULATION PROBLEMS.** A very helpful overview by Dr. Philip Hauser, Director of Population Research and Training Center at the University of Chicago. Discussion questions and reading references are included. No. 206, 1971 **POPULATION.** A global view of the population problem written by a sociologist Valerie K Oppenheimer. Opportunity here for comparison with earlier Headline and Intercom series, and discussion of present trends.

Foreign Policy Association Inc. **INTERCOM** Vol. 6 No. 1, 1964. **FOCUS ON WORLD POPULATION.**

A very helpful review of the work of the U.S. Government, the U.N. and Volunteer Organizations. Maps and charts of the world population are included as well as reports of University programs of research, a bibliography, and a film list.

Vol. 10 No. 4, 1968. **THE WORLD POPULATION CRISIS: WHAT IT IS AND WHERE TO GET INFORMATION ABOUT IT.**


The author makes the point that today's society is not the first to fundamentally alter its habitation. The records, biophysical and written, indicate that prehistoric and historic man were as deeply involved. And since Greece's Golden Age, writers, scientists and philosophers have vehemently disputed the extent of man's prerogatives and the goodness of his works in nature.

Glacken's coverage of the historical antecedents of present day views on nature, and man's proper place in it, is complete, scholarly and delightful reading.

Goldstein, Jerome **HOW TO MANAGE YOUR COMPANY ECOLOGICALLY** Rodale, 1971.

In this brief paperback, Goldstein suggests concretely how corporations can be clean and profitable. His examples of corporate actions which are already underway are varied and encouraging. Students and teachers will find this a good readable resource of current actions.


Distinguished biologists were asked to prepare papers
exhibiting their concern for significant social problems having a biological basis. These papers were then distributed to a panel who, at the 1969 NAPT Convention, then entered into lively discussion with the biologists. The fields which are covered are medicine, behavior, genetics, population and evolution. Excellent background reading for teachers who should go on to read the science fiction based on the projection of these social problems and to include both the facts and the science fiction in their courses. See Sauer VOYAGES on this booklist for some excellent references.

Hamilton, Michael P. Editor THIS LITTLE PLANET. Scribners, 1970.

A fine and long awaited juxtaposition of ecological and religious thought. Three scientists have written summary articles on three central aspects of the environmental problem--pollution, scarcity, and man's place in nature in recent western thought—to which three theologians respond. The theologians write from the viewpoint that the church has a very special responsibility--and opportunity—for promoting environmental welfare and a sane view of man's proper place in nature. They have made a promising beginning at closing the uncalled-for-divide between Christian and ecological ethics.

Jaded readers who feel they have already read several thousands of articles too many about "our environmental crisis," or "our ecological quagmire," may wish to read the theologians' articles only.


A unique collection of short readings. Statements of historical importance as well as recent statements and comments are included. Useful in any course dealing with the social impact of science whether taught in departments of biology, anthropology, economics, sociology, geography or others.


The study of man's environment should certainly encompass art. Here is a collection of striking black and white photographs of plant life, as seen through a hand lens, that reveals the plan and symmetry of growing things. These plant patterns could provide students and teachers with new and exciting departures for creative expression. Material for mathematics is also here in the study of symmetry and spirals. See also Scheffer THE SEEING EYE Scribner, 1971.


Here is a welcome change of emphasis that should provoke lively discussions. The author demonstrates that neither the population boom nor the advance of technology is
to blame for our predicament. Rather we are in the mess we are in because our economic, political, and values systems, operating very well, are producing mess as part of their normal output. In conclusion he presents a plan for peace and tallies up the price we must be prepared to pay to achieve it. A must for teachers in every field, certainly of interest to eager students. The lengthy section of "Notes" at the end is an excellent source for further research.


The first phase in a study designed to determine how governmental institutions can be made more responsive to their citizen's increasing demands for pollution control and resource protection. This volume is an inventory and categorization of the "new answers." An evaluation will soon follow in another volume.

The text is smoothly written, is definitive in its field. The authors raise a number of questions of fundamental concern to serious environmentalists. Undoubtedly fuller answers to these questions will be provided in the second volume.


Intrigue, terror, drama, and fantasy combine to make DUNE and DUNE MESSIAH, a treat for science fiction fanciers. But ecology buffs will be equally pleased since the planet Arrakis boasts a bizarre ecology, faithfully described in every detail by the author, and unusual economic and social arrangements and political machinations based on the utter and extreme scarcity of water. See notes on books by Grobman & Sauer in this list. Also in SOCIAL EDUCATION December 1971 Vol 35 No. 8, an essay by Ray Bradbury, noted science fiction author.


Covers all aspect of nature study with countless detailed suggested activities and projects. A "Project Index" lists 400 additional projects particularly suited for group work, graded according to degree of knowledge, effort and equipment required.


Excellent opportunity for the study of values in this novel depicting the changes in a culture brought about by the rescue of three white men.


Emphasizes interrelationships and the necessity for man
to apply ecological principles to his own species in particular by stabilizing human populations. This is one volume in the Nature and Science Library published for the American Museum of Natural History. Original art, photographs, maps, and charts—many in full color—amplify the text.


This book is a collection of papers that grew out of a 1969 U.S. National Commission for UNESCO conference. It is intended to be a "primer for environmental awareness." Leading experts from such fields as biology, architecture, city planning, sociology, advertising, and psychiatry participated. Each was asked to prepare a paper that would develop his own approach to the environmental dilemma, including suggestions for enlightened action. The latter are summarized in the last chapter. Teachers will find this book another excellent source of readings for an interdisciplinary approach to current problems.

LaFarge, Oliver LAUGHING BOY Houghton-Mifflin, 1963.

The differences in the world view of the Indian and the white frontiersman are definitely expressed in this love story about a young Sioux brave, Laughing Boy, and his woman, Slim Girl, who has been raised in the white settlements. As Slim Girl attempts to re-enter tribal life, the irreconcilability of the Indian and white ways becomes increasingly clear.

Especially impressive is LaFarge's ability to transmit the meaning of a thousand small daily acts in the context of Indian beliefs about religion and nature. Further reading: Borland, Hal WHEN THE LEGENDS DIE; Ellis, Mel WILD RUNNERS; Nomaday, N. Scott HUSS MADE OF BONE.


Neither of these are nice books to cuddle up with on a lazy afternoon, but they do offer the most complete data on the state of our national resources published in single-volume form to date. Readers may merely wish to skim the tables and graphs (which calibrate the future balance between population and such resources as food, minerals, and energy on land and in the sea), and ignore the text, or to take advantage of bonus sections on the human ecosystem, resource planning for the 100+ year future, and so on.

These books should be read in conjunction, since RESOURCES AND MAN does the opposite. Both volumes gaze into the far future, but RESOURCES IN AMERICA'S FUTURE concentrates on the period prior to 2010, while RESOURCES AND MAN concentrates on the years before the year 2000. RESOURCES AND MAN
examine the world resource picture, while resources in America's Future largely confines itself to the American picture.

Laubin, Reginald and Gladys THE INDIAN TIPI: ITS HISTORY, CONSTRUCTION AND USE Ballantine, New York, 1971. Since this is the only comprehensive book in tipis, it is fortunate that is accurately and gracefully written. Whether the reader wants diagrammatic advice on tipi building, or an understanding of the place of the tipi in the culture of the Plains Indians, he will appreciate this book. Included here because it fits in well with discussions of new life styles, an area every teacher should investigate. These will also help—Mother Earth News (see Magazine list), Whole Earth Catalog, also Russell, R. & T. ON THE LOOSE and A.B. Laurel's LIVING ON THE EARTH.


Leopold, Aldo SAND COUNTY ALMANAC: WITH OTHER ESSAYS ON CONSERVATION FROM ROUND RIVER Oxford University Press, 1966. Undoubtedly one of the most quoted authors in the field of conservation. A collection of essays that points up the concept of a land ethic and the need for man to recognize his place in relation to the entire community of things organic and inorganic.

Lewis, Richard, Comp. OUT OF THE EARTH I SING: POETRY AND SONGS OF PRIMITIVE PEOPLES OF THE WORLD Norton, 1968. According to Mr. Lewis, "These people had and still have secrets about living which our 'civilized' cultures could learn from. Part of their secret is that they have not broken their hold on the rhythms of the Earth." Many possibilities for social studies as well as language arts.

Lodge, James P. SMOKE OF LONDON: TWO PROPHESIES Maxwell Reprint Company, 1970. This is a reprint of two tracts inveighing against air pollution and calling for action to abate it— one published in 1661 and the other in the 1880's or 1890's (exact date unclear). Useful by way of comparison in an investigation of the great progress made in London in the last few years.

McCuen, Gary E. & David L. Bender eds. THE ECOLOGY CONTROVERSY: OPPOSING VIEWPOINTS Greenhaven Press, 1970. An inexpensive booklet prepared by two social studies teachers to foster critical thinking. There are readings, case studies, and inquiry exercises. The controversies included are population, nuclear radiation, air pollution and the religious, political and economic consequences of the ecology controversy. This booklet offers a good beginning.
for teachers.


Studies by a practicing landscape architect and planner exemplify the ecological planning method. Case studies of specific regions, communities, and cities are given to demonstrate his concepts. Ties in well with H.S.G.P. units on city planning (see Curriculum Materials section). Now available in paperback so school library can have multiple copies.


This is a good literary history that explores the American attitude toward the natural world as it is treated in literature and art. It highlights a basic conflict of values in American culture that we must comprehend if we are to achieve individual and collective environments of desirable quality.


Professor Metcalf states in his introduction that this yearbook is difficult - "It is a book that will have to be read and reread, and it can't really be understood except as its readers try out its ideas in some kind of instructional context." Detailed teaching strategies and procedures are presented, thereby encouraging and assisting the teacher to begin the absolutely defensible value judgments.

For further reading: Disch THE ECOLOGICAL CONSCIENCE: VALUES FOR SURVIVAL
Barr VALUES AND YOUTH

These are annotated on this list.

Morse, Jim and Nancy Matthews THE SIERRA CLUB SURVIVAL SONG-BOOK Sierra Club, 1971.

A wide sampling of the best environmental songs in America today. The lyrics and music for guitar are included. Certainly a must for all school libraries. Current musical selections can be used to introduce many aspects of environmental problems (listen to the records that accompany the New York Times & Guidance Associates filmstrips listed in this bibliography). A study of the lyrics is also another approach to an analysis of attitudes and values.


This last book in Mumford's series on technology and society affirms man's ability to direct rather than be directed by the environment he lives in. It invites us to sense our own capacity for growth and our capacity to reverse developments which adversely affect our individual and group lives. The extensive bibliography should encourage further
individual exploration.

Munzer, Martha. PLANNING OUR TOWN. Knopf, 1964.

Introduces students to the problems of urban planning. Emphasizes the fact that no community is "an island unto itself" so students will consider their town and city as part of a larger community. At end of text is a list of colleges that offer degrees in the planning profession and a bibliography.


Readings in the history of conservation not only concern natural resources; they also reflect distinctive traits of the American character. According to Dr. Nash "There are few richer lodes than conservation history from which to mine an understanding of American culture." To extend the analogy, students and teachers can also mine the riches of the lengthy annotated bibliography in this book.


Reviews the scope of ecology, structure and function of the ecosystem, ecological regulation, major ecosystems of the world. Influence of man both in and on ecological systems is stressed throughout text. Reading lists at ends of chapters.


By graphs, figures, and photographs Mr. Pringle reinforces his concerns for the biological and ecological problems of overpopulation confronting us, while recognizing the position taken by some economists, engineers and others who differ with his point of view. He strongly poses the problems of a "quality" environment if population trends continue unchecked.


A collection of papers which comprehensively and excitingly challenges the traditional approach to problem solving. This collection views man in nature yet avoids the trap of using technology as the villain. It takes a bold step toward long-range answers. The proposals are thoughtful and well-documented. Compare with Harrison EARTHKEEPING cited earlier.

Rudofsky, Bernard. ARCHITECTURE WITHOUT ARCHITECTS. Doubleday,
1970.

A glorious book, with many masterly photographs, showing how various primitive cultures the world over have designed and built homes and other structures which conform to the land, their ideas about nature, and their religions. This volume would make an excellent companion to McHarg's *DESIGN WITH NATURE*.

Sauer, Rob ed. Foreward by Dr. Paul R. and Anne H. Erlich. *VOYAGES: SCENARIOS FOR A SHIP CALLED EARTH* Ballantine, 1971. Famous authors, many of them writers of science fiction, bring to life in a series of short stories and vignettes the spectre of life on an overpopulated planet. *VOYAGES*, with its striking illustrations of present and impending world problems related to the broad field of environment, compliments books that describe the same problems in purely theoretical terms.

Brief bibliographies at the end of each story lead the reader to more excellent material.

*SCIENCE YEAR: THE WORLD BOOK SCIENCE ANNUAL* Field Enterprises, 1971. This 1971 issue concentrates on environmental problems. There is a special three part feature entitled *THE FATE OF OUR LAKES* which contains an excellent series of overlays demonstrating the process of eutrophication.

Many of the World Book articles are available as reprints which make useful teaching aids.

*SCIENTIFIC AMERICAN - SCIENCE CONFLICT AND SOCIETY* with Introductions by Garrett Hardin Freeman, 1969.

Using this book is an ideal way for teachers to meet the increasing demand for more social relevance in the science curriculum. At the same time, *SCIENCE, CONFLICT AND SOCIETY* is an excellent demonstration of the usefulness of the scientific in dealing with controversies. It includes pertinent book reviews and letters commenting on some of the articles.

*SCIENTIFIC AMERICAN 39 STEPS TO BIOLOGY* with introductions by Garrett Hardin Freeman, 1963.

A collection of articles, with comments, from *Scientific American* on Adaptations, Behaviour, Ecological and Social Problems.

Useful as a supplementary text for general biology courses. Includes important topics of a non-molecular nature often omitted in conventional biology courses.


The philosophy, design, sociology and politics of vest-pocket parks and other small urban spaces. Here, particularly in the section on community action, are more possibilities for student projects. See also Allen's *PLANNING FOR PLAY*
cited earlier, and in the Curriculum Materials section OUR MAN-MADE ENVIRONMENT.


The authors have brought together in one volume a collection of searching and provocative essays on the ecology of man. The central theme is that the well-being of mankind is inescapably associated with a healthy, productive and attractive environment. The authors have put together in contemporary context, the thinking of some of the great scholars and students on the ecology of human populations. The section on "Additional Readings" is excellent.


A comprehensive study of the political history of conservation emphasizing its role in the development of the American government and economy. Bibliography at the end of text. See Davies POLITICS OF POLLUTION cited earlier.

Smith, Robert L. ECOLOGY AND FIELD BIOLOGY West Virginia University, 1966.

A college text in ecology which is a valuable reference. Contains a multitude of illustrations, charts and diagrams, plus voluminous bibliographic references.


Designers too often base their structures on strictly aesthetic, legal or economic requirements rather than on genuine human needs.

In this highly readable volume, the author describes experiments conducted by him and his students, in the Psychology Department at the University of California at Davis, which reveal the process by which people mark out and personalize the spaces they inhabit. Further reading: Hall, Edward HIDDEN DIMENSIONS Doubleday, 1966.


Explains in simple language and with great clarity the complex term, "Balance of Nature."

Terry, Mark TEACHING FOR SURVIVAL Ballantine, 1971.

Starting with the classroom, Mark Terry presents the ethical and practical means for transforming our educational system. The schools can become model environments themselves and thus serve as a central instrument for changing the society.


This was the first large scale evaluation of what has happened and what is happening to the earth under man's impress. These papers focus viewpoints from nearly all fields
of knowledge upon man's capacity to transform his physical-biological environment and upon his cumulative and irreversible alterations of the earth.


Our environment is being ravaged to maintain a high standard of consumption, not a high standard of living. Changing our life style is crucial if we are to survive. This book tells how, with practical advice for groups and individuals. Use this in conjunction with *THE ECOLOGICAL CONSCIENCE* by Disch cited previously.


This is one volume in the *NEW CONSERVATION SERIES* which presents the history and major issues of the new conservation. Useful in a general survey course that calls for easy reading. The other titles are: *MAN, EARTH AND CHANGE, AIR WE LIVE IN, WATER WE LIVE BY, OUR THREATENED WILDLIFE*.


An excellent study of the conflict in environmental values between the Forest Service and various conservation groups. Presents the political rights and strategies of both sides.

Explain the painful double role of the Forest Service which is required by law to protect the forests, but also to provide controlled use of the forest to lumber, mining and recreation interests.

Articles such as this are useful for discussions of conflicting values. See *SCIENCE AND SOCIETY*, listed under Bibliographies for more such references.
AIR POLLUTION EXPERIMENTS for JUNIOR AND SENIOR HIGH SCHOOL
SCIENCE CLASSES. Air Pollution Control Association.

This manual of experiments is designed to acquaint
students at both the junior and senior levels with some of
the problems and effects of air pollution and some of the
practical means of overcoming them. Experiments have been
selected and designed to utilize equipment and instruments
which most high schools would have in their chemistry, phys-
ics, or biology laboratories.

Three other valuable sources:
Air Pollution Experiments High School Edition Cooperative
Extension Service, Rutgers University
SCIENTIFIC EXPERIMENTS IN ENVIRONMENTAL POLLUTION E.C.
Weaver, ed Holt, 1969.
EXPERIMENTS FOR THE SCIENCE CLASSROOM BASED ON AIR POL-
LUTION PROBLEMS State of California, Department of Public
Health.

American Association for the Advancement of Science CATALOGUE
OF TAPES OF SELECTED SESSIONS 1968 & 1969 Meetings AAAS.

The tapes are selected for their current relevance and
importance "In the absence of any censorship or content
editing, the listener should not be surprised to hear the
calm presentation of an experienced scientist followed by
heated exchange with a young activist." Available as reels
or as cassettes.

American Education Publications
Well illustrated, inexpensive units, good for easy-to-
read introductory material;
OUR POLLUTED WORLD by ARP staff writers, 1963. Helps
students understand the scientific principles involved in
both the causes and effects of pollution. Shows how this
knowledge can be applied to overcome this national problem.

THE CONSERVATION STORY by George Pollock, 1969. An
historical overview of great conservation battles in U.S.
History. Through case studies, it probes today's most
urgent conservation questions: the fight over DDT, the red-
woods issue, air pollution, water pollution and strip mining.

ECOLOGY: MAN EXPLORES LIFE by Jacqueline L. Harris and
Erwin A. Steinkamp, 1970. A study of ecology through case
studies of scientists at work. As readers absorb ecological
concepts, they also require a knowledge of scientific prob-
lem-shaping techniques.

B.S.C.S. - HIGH SCHOOL BIOLOGY Green Version 2nd ed. Rand
McNally, 1963.

The "Green Version" approach to biology is an ecological
one. This text and the accompanying lab manual, although not
the most innovative, do satisfactorily present the fundamen-
tals of ecology. There are other B.S.C.S. publications
related to ecology and the environment which are very useful—some of the B.S.C.S. Pamphlet Series from Rand McNally, B.S.C.S. Laboratory Blocks from D.C. Health and films from King Screen Productions.

A CURRICULUM ACTIVITIES GUIDE TO WATER POLLUTION AND ENVIRONMENTAL STUDIES Institute for Environmental Education.

This is the outgrowth of a project started at the Tilton School, in Tilton, New Hampshire.

As stated in the introduction to the guide "there is a desire on the part of students today to be directly involved in their society. This program is intended at least to both answer and capitalize on that desire. As one student remarked "You actually learn by going out and doing what you are learning in theory, which is something I never did before." Thus the guide is primarily activity oriented. It is concerned with only one aspect of the environment - water pollution. But the students soon discover that this problem is multi-faced. The social and political as well as the scientific aspects of the problem are emphasized so that activities include all departments of the school. In addition to carefully outlined activities, there are lengthy bibliographies and several detailed appendices on all aspects of implementing this curriculum.


This guide offers plans for an enrichment program in urban exploration involving junior and senior high school students and second graders. The procedural aspects are clearly delineated. To broaden the concepts of this program and to suggest more projects for those students eager to become involved outside the classroom in work with younger children another elementary guide PLANNING FOR CHANGE - A BOOK ABOUT NEW YORK CITY AND HOW TO CHANGE IT Center for Urban Education, 1969. (See also Allen PLANNING FOR PLAY and Seymour SMALL URBAN SPACES listed under books in this bibliography. Another fascinating way to explore a city is described in ANTHROPOLOGY IN THE TOWN in HABITAT February 1967, Vol. 10, No. 1.


This program provides an interdisciplinary approach to earth science which weaves the various disciplines together to provide a comprehensive view of the planet earth and its environment. A series of investigations provide the student with experience to better understand the content. The main difference between this and earlier efforts is the interdisciplinary treatment and the investigative nature of the approach. Objectives are stated in the ESCP Teacher Guide and ESCP Newsletters. Specific subjects: astronomy, meteorology, geology, oceanography, geography, environmental studies.
Grade level: grades 8-10 depending on ability level of students, can be used with low ability students if investigations are the primary classroom activity. Textbook primarily designed for average and above average students in the 13-15 age bracket.

The ESCP pamphlet series is a most valuable well-illustrated source of information, activities and references. These can be used independently of the text. The ESCP Pamphlets available to date are:

1. Field Guide to Weathering
2. " " Soils
3. " " Layered Rocks
4. " " Fossils
5. " " Plutonic & Metamorphic Rocks
6. " " Beaches
7. " " Lakes
8. " " Astronomy without a Telescope
9. " " Color of Minerals
10. " " Meteorites


This is a board game for two, three or four players. The game deals with some of the key processes by which species survive and evolve, or become extinct: reproduction, migration, mortality, competition, predation, and genetic change. It also illustrates the complex and sometimes devastating chain reactions which may be started by changes in the environment, particularly those caused by man. Teachers may request the excellent Teacher's guide. There are many possibilities for adaptations and variations to fit the teacher's particular purposes.


This booklet contains brief statements by six educators and population specialists on the need for curriculum revision, ways of incorporating the topic of population into the existing courses, and strategies for arousing school interest in the population crisis. Included is a bibliography of selected books, pamphlets, and films on population and family planning.

FIELD STUDY MANUAL FOR OUTDOOR LEARNING  Milliken, Margaret et al. Burgess 1962.

A manual of activities for studying natural resources. The first section deals with mapping the field study area. The following sections detail activities in the study of soil, water, plants, animal life and weather. Another useful manual, with some keys not found elsewhere, is Game Biology and Game Management, by H.H. Stains, Burgess 1962.

A sampling of programs which social studies teachers will find provocative. Detailed comments on projects for elementary and secondary levels followed by a bibliography.

HIGH SCHOOL GEOGRAPHY PROJECT Association of American Geographers.

A year long course made up of six units with complete teaching materials - student resources, workbooks, teacher's guides, filmstrips, phonograph records, transparencies, maps, air photos, games.

In particular teachers interested in environmental subject matter will want to consult the "Habitat & Resources" unit and selected activities in the "Geography of Cities" and "Manufacturing and Agriculture" units.

From Geographic Discipline to Inquiring Student is the final report on the High School Geography Project. This covers the work of the project since its inception in 1961. The appendices are particularly valuable for an overview of the project content.

The Local Community: A Handbook for Teachers Macmillan, 1971. This handbook is a reference and guidebook for teachers that includes many teaching and learning suggestions using the local area as the prime resource.

The handbook has four sections: 1) Relating geographic concepts to the local community; 2) Preparing to teach about the local community; 3) Classroom activities and 4) Selected bibliography. Included are a series of thirteen inquiry-oriented activities about the local community and almost all are examples from actual local areas. How to use Local History a pamphlet from N.E.A., would be a useful addition.

Another interesting pamphlet, Environmental Geology in Towne and Country by W.C. Hayes & J.D. Vineyard, opens up a rapidly expanding facet of geology that could be used in conjunction with H.S.G.P. It is available from Missouri Geological Survey & Water Resources, Rolla, Mo.

IMPROVE YOUR ENVIRONMENT: FIGHT POLLUTION WITH PICTURES (#AC-26) Eastman Kodak Co.

Suggestions for a variety of photographic environmental action projects. Excellent colored illustrations.


"Classroom discussion of the global population crises must be organized around two sharply contrasting themes: one of the almost unrivaled dangers; the other, of new optimism that the problems may be resolved during the remainder of this century." The author lists "assumption for student inquiry" on many aspects of these two contrasting themes and gives information and resources for student use.
MAN AND HIS ENVIRONMENT: AN INTRODUCTION TO USING ENVIRONMENTAL STUDY AREAS Association of Classroom Teachers, NEA 1970.

A new interdisciplinary approach to environmental education at all school levels. It provides practical suggestions for classroom teachers for use of the environment to help students understand relationships between man and his environment. A unique aspect of this approach is the utilization of the "strands" which can be applied to any subject area. The "strand" approach uses such broad universal concepts as "inter-action and interdependence" as a way of drawing the environment under a total integrated "umbrella." A filmstrip also entitled Man and His Environment will orient teachers and the public to this strand approach.


This is essentially a basic science text for junior high but is included here because it is a worthwhile source of activities for high school teachers. If the format were less elementary it could be used directly with certain high school classes. Four simulation games have been developed to go with this text but they are of doubtful value.


This booklet describes and illustrates unique miniature land and water environments in which plants and animals thrive in controlled, simulated environments that contain all necessary life-support elements and processes. These can be constructed by students for classroom use.

1971 NATIONAL Eq INDEX National Wildlife Federation.

Reprinted from October-November 1971 National Wildlife Magazine. Report on how our environmental quality is deteriorating at an accelerating rate. Includes Eq Index of Air, Water, Soil, Timber, Minerals, Wildlife and Living Space. One reprint may be obtained free from NWF.

A bibliography is also available giving the references on which the statistics in the Eq Index are based.

OUR MAN-MADE ENVIRONMENT BOOK SEVEN Group for Environmental Education (GEE).

A most unusual and exciting text-workbook that is an introduction to the study of the man-made environment. Although developed from grades 7-9, this program has many stimulating ideas for high school students and teachers. It poses four basic questions: 1) What is the man-made environment? 2) Why do we build our environment? 3) What determines the form of our environment? 4) How do we change our man-made environment? Several different kinds of problems are proposed for students to work through, some by discussion and some by constructing various forms and buildings included in punch-out form. The book emphasizes that there are no
right or wrong answers, only choices for the student to make depending on the way he sees his world or wants to make it.

The basic ideas and techniques of this program can be expanded as the high school student studies urban areas using the High School Geography Project or becomes involved in community projects such as Doing Germantown (This and HSGP are annotated in this section). The art student will also find this book stimulating.

GEE has other programs underway that will soon be in print.

The spring issue of Design Quarterly, published by the Walker Art Center, Minneapolis, Minnesota, is entitled Making the City Observable. It is a rich source of ideas on urban environmental education.

A different aspect of design, explored in Sommer Personal Space (cited in the Book section) can be introduced as students expand their study of the Man-Made Environment.


A 1-12 curriculum. Each guide contains individual lessons, lists of instructional materials and a bibliography. The following guides provide some useful ideas for senior high school teachers - Social Studies Grade 10-12, Home Economics, Biology and Outdoor Laboratory.

POPULATION PROBLEMS AND THE SECONDARY SCHOOL CURRICULUM
Planned Parenthood - World Population.

This booklet contains brief statements by six educators and population specialists on the need for curriculum revision, ways of incorporating the topic of population into the existing courses and strategies for arousing school interest in the population crisis. Included is a bibliography of selected books, pamphlets, and films on population and family planning.

POPULATION CURRICULUM STUDY, K-12 University of Delaware, 1971.

Materials were out-of-stock when ordered for review for this bibliography. The following comments are quoted from a variety of reliable sources. "An elegant conceptual scheme based on the belief that "man is a part of a natural system, the Earth, and is ultimately subject to the limits of the system." "Accompanied by the most complete bibliography of books, periodicals, and films seen to date." "Concepts are to be infused throughout the K-12 curricula, rather than delivered all at once. Appropriate subconcepts are recommended for three grade clusters (K-4, 5-8, 9-12), although they needn't be followed strictly." "The curriculum is broadly based and includes many perspectives on population." Materials will soon again be available.

POPULATION REFERENCE BUREAU
POPULATION BULLETIN; WORLD POPULATION DATA SHEETS; POPULATION
PROFILES.

P.R.B. is the best source of information on facts about size, composition and dynamics of the world's population and analyses of the impact of these demographic facts on the quality of human life throughout the world. Membership is only $5.00 for teachers and all members receive all regular P.R.B. publications.

PROGRAMS IN ENVIRONMENTAL EDUCATION National Science Teachers Association.

Describes over 50 programs in schools around the country. Programs include all formats and grade levels. Only programs now underway and able to distribute materials and/or information have been included.

RESOURCE UNIT ON POPULATION PRESSURE Baltimore City Public School Bureau of Publications, Baltimore.

A Teacher's Guide for the teachers of the Baltimore Public Schools at all levels. The pamphlet attempts to alert teachers to population pressure at local to international levels. Background information is presented, suggested approaches given, and a bibliography of instructional materials is included.


This book has two stated purposes--first to make the student aware of the current environmental crisis; second to help students learn to communicate better, especially by way of language. In this area of suggested communication activities the teacher will find many workable suggestions.

SCIENCE AND SOCIETY Madison Public Schools, 1969.

This syllabus is designed as a teacher guide for a one semester seminar course. The course is an attempt to provide science and society. The course requires that each student alternate solutions to the selected problem. This syllabus would be particularly useful to a beginning teacher. The course plan is outlined and general problems are suggested. There is also a lengthy bibliography. This ties in well with SCIENCE, NATURE, & THE SURVIVAL OF MAN listed below. Madison Public Schools, 545 West Dayton St., Madison, Wisconsin.

SCIENCE, NATURE, AND THE SURVIVAL OF MAN Pennsylvania Department of Education.

This is a course for secondary students not majoring in science, developed for Grades 11 & 12. SNSM is not a tightly structured program identified with a particular science discipline. It is intended to foster the study of subjects identified as important by students and teachers reacting to their local circumstance.
The philosophy stated in the Teacher's guide and the evaluating tool - SNSN SCALE are well worth consideration.

SMAC/SCIENCE & MATHEMATICS EDUCATION ANALYSIS CENTER ERIC: HOW TO USE IT FOR ENVIRONMENTAL EDUCATION.

Request this report from SMAC to obtain complete information on the retrieval of reports, curriculum guides, journal articles, etc. on environmental education. A complete listing or ERIC Clearinghouses is given. Write for Newsletters from those in your field.


This issue of the NCSS journal is entirely devoted to the Environmental Crisis and incorporates an interdisciplinary approach. Contributors include a conservationist, a biologist, an economist, a psychiatrist, a classroom teacher, an artist, a community leader and several senators. There is also a lengthy section on sources and resources and instructional media.

FILMLOOPS
Grade 10 - Grade 14

These are single concept films in a convenient cartridge. There is no sound track thereby making it possible to adapt them to each teacher's needs. They cover a wide variety of subjects and are particularly useful for independent study.

Salting Film-loops is one of the leading producers. Among their titles are the following: ADAPTATION TO ENVIRONMENT, MARINE BIOLOGY, KILLING WEEPS WITH 2, 4-D and THE CHANGING CITY.

3.4.C.S. (see curriculum materials section) has produced several excellent filmloops.

Catalogs from instructional materials producers will list others.
FILMS
Grade 10 - Grade 12

This is a very brief listing of films. Here again the possibilities are so numerous that it is beyond the scope of this bibliography to list them all. There are, however, several film bibliographies cited in the bibliography section, and references made under periodicals to those containing film reviews.

BEARGRASS CREEK color 19 mins. Stuart-Finley Productions.
This story of a stream is the story of many polluted waterways in our country. The road from clean water to polluted water is only a short distance in time and effort. It is much longer and more difficult to reverse the directions.

CONSERVATION AND BALANCE IN NATURE color 18 mins. International Film Bureau.
The word "ecology" has become almost a household term without most persons knowing what it means. The film relates through easily understood examples taken directly from nature, what ecology is. It also examines man's role in affecting balances in biological communities.

Tells how man has changed and spoiled his environment through the waste of natural resources and the pollution of air and water. Suggest ways of preserving the resources.

Man first struggled to survive in a hostile environment. Now that he has survived, he is fast destroying the very environment upon which his life depends. Slow start, but otherwise very useful film.

Our growing problem of vandalism and littering is a national disgrace. Each of us can help to correct this situation. This film gives the youngsters some ideas on how this can be done.

Man is rapidly destroying his natural environment and there is an end to our natural resources. Is urbanization worth losing all our natural areas? Can anything be done about it?

Populations of plants and animals including humans have natural limits that are set by the environment in which they live. There are many factors which affect population and their interactions are complex.
A STRAND BREAKS  color 15 mins.  Encyclopedia Britannica.
The natural balance of the living community is usually maintained by the interrelationships of all its inhabitants. Man, however, through ignorance and self-interest, often upsets this balance and suffers the drastic results. Emphasizes that man must intelligently manage his environment.

Each life - plant or animal - is like a tiny strand in having its effect on other lives. Shows how some die out while others develop.

The ever-increasing problem of solid waste disposal is discussed along with related air and water pollution sources. Some of the new techniques of solid waste management are demonstrated.

This film on issues of population is a classroom version of Garrett Hardin's article of the same title in the December 13, 1968 issue of Science. Tragedy of the Commons draws an illustration from 18th century England where farmers shared the benefits of a mutual pasture for their animals. Profit motive competed with limited space, and the commons failed. The film goes on to develop the analogy between the destruction of the commons and our current dilemma of rapidly diminishing resources, overcrowding, and stress on a finite earth.

Water is important to all living things. Its physical characteristics make it the ideal medium for transport of food and waste products between cells. Describes evolutionary changes as plants and animals left the water to live on land.
FILMSTRIPS
Grade 10 - Grade 12

AIR POLLUTION AND YOU  Current Affairs Films, 47 frames, silent, color.

An up-to-date presentation on how, what, and where air pollution is and how it effects all of us. Photography, graphs and current facts add to this film's usefulness. The questions and ideas for further investigation are very good.

AMERICA'S URBAN CRISIS  Society for Visual Education, sound, color.


On site photography in six major U.S. cities. Students examine urban dilemmas where industrial and technological achievements and personal irresponsibility have created by-products that menace the quality of urban life. Problem-oriented segments at the end of each filmstrip stimulate discussion.


Series Titles: MAN, AN ENDANGERED SPECIES?, BREAKING THE BIOLOGICAL STRAND, VANISHING SPECIES, PRESERVE AND PROTECT, and THE POPULATION EXPLOSION.

A technically superior package of color filmstrips, recordings and teacher's text presents an objective, scholarly and ecologically sound treatment of five aspects in the generation of public issues.

ECOLOGY  McGraw-Hill, 52 frames, silent, color.


A variety of presentations on ecological communities with their plant and animal relationships. Many definitions. Develops succession and many basic concepts. Good questions and activities suggested. Can be adapted for use at lower grade level.

ECOLOGY AND MAN Set I, McGraw-Hill, 50 frames, silent, color.

Series Titles: INTRODUCTION TO ECOLOGY, CHANGES IN ECOSYSTEMS, ENERGY RELATIONSHIPS, HABITATS AND NICHES, POPULATIONS AND BIOMES, ADAPTATIONS TO ENVIRONMENT. This series introduces basic ecological principles and vocabulary and each film develops in sequence a major concept. Excellent color, good questions for discussion. They may be adapted for use according to ability. Supplementary information and explanation by user is necessary.

ECOLOGY AND MAN Set II, McGraw-Hill, 50 frames, silent, color.

Series Titles: THE FOREST BIOME - PART I & PART II.
THE GRASSLAND BIOME, THE DESERT BIOME, FRESHWATER ECOLOGY, SEACOAST ECOLOGY.

This series shows how the basic ecological principles operate in the major biomes and habitats. Prior knowledge of concepts and terminology is necessary for use of these filmstrips. The color is excellent, good discussion material adaptable according to ability.

ECOLOGY AND MAN Set III, McGraw-Hill, 50 frames, silent, color.


Presented in this series are man's successes and failures in managing nature for his own benefit, and problems presented by the failures. Users should be familiar with basic ecological principles and terminology. Manual has good discussion questions and suggestions for further activities and reading.


Part I explores the individual's relationship to environmental issues; as part of the problem and the solution. Part II discusses the possible role of government and private institutions in combating environmental decay. The series stresses that individual values and activities must be changed to improve the quality of life. Detailed Teacher's guide.

ENVIRONMENTAL POLLUTION--OUR WORLD IN CRISIS Ward's, 64 frames, silent, color.

Series Titles: NATURE OF THE CRISIS, ATMOSPHERIC POLLUTION, LAND POLLUTION, FRESHWATER POLLUTION, MARINE POLLUTION, POLLUTION CONTROL.

Content of filmstrip covers subject well. Very informative, good questions should lead to discussion. Introduces references for further study. Environmental vocabulary is introduced. Some of the concepts will require additional study. Very good accompanying manual.


Part I demonstrates through such examples as the death of Lake Erie or the Santa Barbara oil spill, the catastrophic dangers of environmental pollution. Part II outlines ways to avoid the destruction of our environment. Detailed Teacher's guide.


Series Titles: Group II - LIFE IN A SAND DUNE SUCCESSION, LIFE IN A BOG, LIFE IN AN ALPINE ENVIRONMENT, LIFE IN A FALLEN LOG MICROCOMMUNITY. Explains animal and environmental
interdependence, plant-animal communities, importance of biotic and abiotic conditions. This group is of particular value because of the unusual communities which it includes.

Part I defines the scope of the world population explosion and outlines its consequences. Part II describes measures now underway to control the population explosion. Students see efforts to develop fish-based foods and miracle grain crops and consider the work of the U.N. in this area. Detailed Teacher's manual.

SQUANDERED RESOURCES New York Times, Book & Educational Division, sound, black and white.
This filmstrip presents a historical summary of the use and misuse of resource needs and resource potentials. The sound filmstrip provides appropriate breaks for discussion and the manual offers helpful background and bibliography. However, the 71 frame presentation is limiting and contains much information. It should probably be divided for use in two successive classroom sessions.

TOPICS IN ECOLOGY Multi-Media Productions, sound, color.
Series Titles: WHAT IS ECOLOGY, WHAT IS POLLUTION, WHAT IS AIR POLLUTION, THE AUTOMOBILE, BEYOND POLLUTION, PROSPERITY=POLLUTION.
This series gets at man's attitudes and values--priorities which have caused today's ecological disasters. The excellent contemporary photography is realistic and the narration poses many questions for class discussions.

As a technological pioneer . . . and a naturalist-conservationist, Charles Lindbergh offers students unique insights into questions raised by the conflict between expansion and the drive to preserve natural lands. Detailed Teacher's manual.
CONSERVATION POSTER SET  J. Weston Walch, Publisher.
Each poster carries a large illustration and a thought-provoking commentary. Posters in each set are coordinated to give a survey of the area under study. 18 posters per set, 11" x 14". The sets include such titles as Ecology of the City, Conservation of Wildlife, Air Pollution.

HENRY GIPSON ECOLOGY POSTERS  Synergisms.
Six colorful 21" x 3' posters that will delight Henry Gibson admirers. Also put across a worthwhile message on eco-pollution. Students will have suggestions for many other posters.

Colorful painting 42½"x 29½", depicts many sources of man-made pollution.

LIFE EDUCATION REPRINTS ON THE ENVIRONMENT  Life Education Program.
A vivid visual survey of the declining environment is available in this series of reprints. The reprints assess the "environmental damage" to air, water, and wildlife and directly or indirectly to man himself. Most are easy to read and all contain numerous large full-color photos of the conditions described. Especially recommended - "ENVIRONMENT: WHAT CAN BE DONE?" WATER POLLUTION--THE BLIGHTED GREAT LAKES and AIR POLLUTION.

STUDY PRINTS  Society for Visual Education.
These are 13" x 13" colored prints on heavy stock. The set entitled GEOGRAPHY FROM SPACE is most interesting and would be useful in any secondary course in Earth Science or Astronomy. The NASA publication ECOLOGICAL SURVEYS FROM SPACE also fits in well here.
AMERICAN FORESTS
$7.50 year subscription. Monthly, 65 pages: "For the advancement of intelligent management and use of
our forests, soil, water, and wildlife, and all other natural resources necessary for an environment of high
quality and the well-being of all citizens."

AUDUBON
National Audubon Society, 950 3rd Avenue, New York, N.Y. 10022.
$10.00 with individual membership ($2.00 single copy) in society "for the conservation and appreciation of wild-
life and wilderness, natural resources and natural beauty." Bi-monthly, 130 pages noted for its excellence of material
and color photography.

AWARENESS
Goff and Wagoner Nature Publications, 4031 Royer Road, Apt. 209, Toledo, Ohio 43623.
$3.00 subscription, $5.00 single copy. "New monthly pub-
ication designed for teachers, leaders and others who want
to learn more about the out-of-doors and the techniques
which help to make the out-of-doors more enjoyable and mean-
ingful to others; especially children." 16 pages.

CATALYST FOR ENVIRONMENTAL QUALITY
274 Madison Avenue, New York, N.Y. 10016
$5.00 subscription, $4.00 per year for students.
Quarterly, 36 pages, concerned with the total environment
and aims "to help educate people to the threats to their
environmental well-being and a need for a change of atti-
dude to quality rather than quantity values."

CLEAR CREEK
617 Madison Street, San Francisco, Cal. 94105
$5.00 year subscription. Monthly. CLEAR CREEK directs
itself "to uniting vision with fact, and daily living with
universal concepts." Newspaper format and stock. Articles
on current problems and new life styles.

THE CONSERVATIONIST
State of New York, Department of Envi-
ronmental Conservation, Albany, N.Y. 12201
$2.00 year subscription, $5.00 for three years. Bi-
monthly. Contents include student's page and How-to-do-it
series. This is probably the best magazine from a State
"Conservation Department."

CONSERVATION NEWS
National Wildlife Federation, 1412 16th
St., N.W. Washington, D.C. 20036
Free service made possible by contributions received
for their wildlife conservation stamps. Bi-weekly, 15 pages.
National issues highlighted.
DEFENDERS OF WILDLIFE NEWS  Defenders of Wildlife, 730 Dupont Circle Bldg., Washington, D. C. 20036
$5.00 with active membership in organization dedicated to the preservation of all forms of wildlife. Quarterly, 135 pages, a magazine of wildlife issues and educational articles (including predator control, endangered species, wildlife interests in Congress, extensive book reviews).

DESIGN AND ENVIRONMENT  6400 Goldsboro Road, N.W. Washington, D.C. 20034
$11.00 year. Monthly. The interprofessional magazine for architects, engineers, city planners, landscape architects, and teachers and students investigating man and his environment particularly urban.

ECOLOGY TODAY and ECOLOGY TODAY NEWSLETTER  Ecological Dimensions, Inc., P.O. Box 130 West Mystic, Conn. 06388
$6.00 year subscription. Monthly, 43 page magazine and 6 page newsletter, alternate.

EFFLUENT SOCIETY  An Occasional letter from Northeast Student Council on Pollution and the Environment (SCOPE), P.O. Box 8456, Boston, Mass. 02114
Free, 32 pages, includes regional and local news of environmental issues.

$7.50 subscription or $10.00 membership in young activist organization which focuses concern upon the environmental crisis. Bi-weekly, 15 pages, packed with in-depth information on material issues.

FOXFIRE  Rabun Gap, Georgia 30568
$3.00 year. Quarterly. Foxfire is produced by a group of Appalachian high schoolers who wanted to know and tell others, how their grandparents made it before the advent of modern technology. In search of a fading culture they scout the surrounding hills with cameras and tape recorders, finding senior citizens either to relate and demonstrate mountain religion, life ways, and survival skills. With the help of the Rabun Gap Outriders a group of Puerto Rican students at a lower East Side high school in New York have founded a kindred journal, the Fourth I, soon to be joined by a journal by American Indian students.

HUMANITIES  National Endowment for the Humanities, Washington D.C. 20506
A most interesting quarterly newsletter that will alert the teacher to new ways of incorporating the Humanities into environmental education.

THE JOURNAL OF ENVIRONMENTAL EDUCATION  Dembar Educational Research Services, Box 1605, Madison, Wisconsin 53701.
$7.50 subscription, $5.00 for students, $2.00 single copy. Quarterly. 48 pages, black and white, no photographs. "Devoted to research and development in conservation communications." Vital addition to professional libraries in every school.


$7.50 with membership, $4.00 to schools, libraries and students, $1.00 single copy. Society is incorporated to secure the preservation of wilderness. Its "long-time broad purpose is to increase the knowledge and appreciation of wilderness, wherever found, and to see established enduring policies and programs for its protection and appropriate use." Quarterly, 48 pages.

MEDIA AND METHODS  134 N. 13th Street, Philadelphia, Pa., 19107.

$5.00 year. Monthly, September-May. This periodical (formerly EDUCATOR'S GUIDE TO MEDIA AND METHODS) offers sound media reviews and information, with articles that seek to startle the staid.

MELANCHOLY ACCIDENT  Mid-Atlantic Student Council on Pollution and the Environment (SCOPE) Box 5071, Richmond, Va., 23220.

Free, monthly. Includes regional and local news of environmental issues.

THE MOTHER EARTH NEWS  P.O. Box 38, Madison, Ohio 44057.

$5.00 year subscription, $1.00 single copy. Bi-monthly, 99 pages, black and white; "edited by, and expressly for, today's influential 'hip' young adults. The creative people. The doers. The ones who make it all happen. Heavy emphasis is placed on alternative life styles, ecology, working with nature and doing more with less."

NATIONAL GEOGRAPHIC  National Geographic Society, 17th and M Streets, Washington, D.C. 20036.


$10.00 year with Associate membership, $8.00 student membership, $1.00 single copy. This Association has "responsibilities primarily in protecting the National Parks and Monuments of America, in which it endeavors to cooperate with the National Park Service while functioning as a constructing critic, and to protecting and restoring the whole environment." Monthly, 40 pages, black and white.
NATIONAL WILDLIFE  National Wildlife Federation, 1412 16th Street, N.W. Washington, D.C. 20036

$6.50 year with Associate membership in organization dedicated "to create and encourage an awareness among the people of this nation of the need for wise use and proper management of those resources of the earth upon which life and welfare of man depends: the soil, the water, the forest, the minerals, the plant life and the wildlife." Bi-monthly, 55 pages, noted for many color photographs. Environmental education materials available, also kit for National Wildlife Week. "Ideas for Learning" a Teacher's guide to National Wildlife is now being published. NWF also publishes International Wildlife, similar in format and with "Ideas for Learning" guide free to teachers.


Free, bi-weekly, 6 pages, national issues covered.


$5.00 year, six per year as part of membership. Contains perceptive studies of important problems of expanding population.

POPULATION CHRONICLE Population Council, 245 Park Ave., New York, N.Y. 10017.

Free, 4 to 6 times a year covers a broad field of population and family planning in brief, non-technical terms.


$10.00 year subscription, $5.00 for six months. Weekly coverage of health and human ecology news, 8 pages. Includes an "Eco-Action" section to get the reader directly involved in doing something concrete for the betterment of the environment. "If you do nothing else, try to carry through that project," which may be clipping and mailing coupons to senators on national issues, planting a tree or cooking an organic dinner.

THIS MAGAZINE IS ABOUT SCHOOLS 56 Esplanade Street East, Suite 301, Toronto 215, Ontario, Canada.

$4.00 subscription in the United States, $1.00 single copy. Quarterly, 160 pages, innovative educational thought.
BIBLIOGRAPHY


Stotler, D. Environmental education as liberation. *The Educational Digest*, May 1971, ERIC.
The writer was born June 2, 1918, at Lebanon, Kentucky. She attended the public schools of Marion County, graduating from Saint Charles High School in 1937. Undergraduate work was completed at Nazareth College with a major in English-Speech and a minor in mathematics. The M.A. degree was received at Western Kentucky University with a major in counselor education.

The writer's teaching experience includes thirteen years on the junior and senior high school levels. Teaching positions include the following: English, history, Latin, and mathematics teacher at Old Kentucky Home High School; English teacher at Nelson County Senior High School. She is currently an English teacher in Nelson County Senior High School, Bardstown, Kentucky.