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ABSTRACT

Resource information and ideas for curriculum programs related to the study of the environment are presented in this resource guide for elementary and secondary teachers. Activities in the outdoors and action programs representative of recent district and county activities in Alameda County, California, are discussed. A list of resources, agencies, organizations, and programs, and a bibliography of library materials are also provided. The appendices include (1) the California State Education Code and (2) Federal and state laws and regulations pertaining to the environment. (NQ)

ENVIRONMENT

That which can best be learned inside the classroom should be learned there, and that which can best be learned through direct experience outside the classroom, in direct contact with the environment and life situations, should be learned there.

L.B.Sharp

ENVIRONMENT – A WAY OF TEACHING

Grades K-12

Approved by

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William P. Burke, President
A. Anthony Bilotti, Vice-President
Mrs. Virginia M. Birdsall
Robert E. Clayworth
John J. Hagerty
Ronald J. Motta
Lee S. Simpson III

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The section on *Resource Agencies, Organizations, and Programs* was prepared by Miss Mary Jefferds, Director, Bay Area Educational Services, National Audubon Society.

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Dr. Mary DuFort,
Alameda County School Department

Neil Evans, Mission San Jose High School,
Fremont Unified School District

Mrs. Marjorie Galvin, Redwood Intermediate School, Castro Valley Unified School District

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Sunol Glen School District

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FOREWORD

The Alameda County School Department is indebted to the consultants and many school district personnel who provided ideas, printed material and photographs for this resource guide for elementary and secondary teachers throughout Alameda County.

The guide was recommended for publication by the Alameda County Schools Publications Review Board. School district representatives on the Board exchange information on needs and plans for curriculum publications so that every school district in Alameda County can have immediate access to them.

This publication for grades K-12 has been produced in response to a need for resource information and ideas for curriculum programs related to the study of the environment. It is hoped that it will facilitate the development and improvement of such programs.

CONTENTS

NATURE

will bear the closest inspection.
She invites us to lay on eye level
with her smallest leaf
and take an insect view of its plain.

Thoreau

he declining quality of our environment is one of the most critical problems that confront us. Improving and changing programs related to the study of the environment is one of our greatest needs.

Environment – A Way of Teaching suggests that we embrace environmental education as a fundamental aspect of the overall curriculum. A high priority is placed on the ways of teaching, the processes of inquiry and problem solving.

Information and ideas gained from such sources as action programs, activities in the outdoors, library materials, and resource agencies, organizations and programs are used to teach through the environment, using the community as a source of learning experiences.

New experiences are selected to involve students in the critical analysis of, among other things, the social values and interactions that underlie environmental degradation. There are opportunities to conduct open-ended inquiries into the specific problems of an actual community.

Environmental learning must involve all aspects of the environment, the physical and chemical, the biological and the social. Its success will be measured in terms of its ability to moderate society's impact on the environment and to bring changes in human behavior.

Selected excerpts from

CONSERVATION

We define conservation as the rational use of the physical environment to promote the highest quality of living. This definition encompasses the major human concerns of this generation: the destruction of amenities; blight in our cities; pollution of our land and landscape, our air and water; loss of physical and mental health. These concerns of conservation immediately involve persons of all ages because they are the vital elements of homes, neighborhoods, cities and countrysides. Conservation and conservation education apply to the total environment with man himself as the subject. People must come to realize that dirty rivers, polluted air and an unkempt landscape need not be the price we pay for industrial progress and economic growth.

This definition places man under a moral obligation to understand the world in which he lives and to protect, enhance and make the highest use of the land and resources he holds in trust for future generations. In view of the importance in which the Committee holds the human resource, we believe that the primary goal of conservation education should be the creation of an environment in which the individual can make the highest and wisest use of his talents and potentialities. Education is charged with the primary responsibility for developing this human resource.

It is our conviction that the proper utilization of resources will secure for man the following benefits:

- A sufficiency of products to make his life useful and self-satisfying. These products enable man to fulfill his needs in respect to food, shelter, transportation, communication and other necessities and comforts of life.
- An environment the quality of which will inspire the highest and wisest development of his potentialities without subjecting him to the hazards of water contamination, air pollution, excessive noise, urban crowding and other such consequences of poor resource development and utilization.
- An aesthetically pleasing environment in which natural

and man-made beauty, historical and recreational resources are available to all.

• The assurance that these benefits will be available to those who will live on earth after us.

The Committee realizes that such a philosophy involves careful planning and orderly development. We do not have all the answers, but we need now to use the knowledge we have to plan for a future based on an understanding that allows for harmonious living with nature. This planning and our survival can only be achieved through education at all levels from kindergarten to retirement. The ecological principles on which man's future depends must be understood by all professions, by public and private resource management people, by politicians and employees.

Such a philosophy of development and planning for highest and wisest use implies that there are choices to be made. Who is to make these choices? We feel that all citizens should be given the opportunity to participate in this decision-making process. This calls for an electorate informed on the issues and working through government and other social institutions to insure that the wisest possible decisions are made.

CONSERVATION EDUCATION

We define conservation education as the means of achieving an educational philosophy that will help each student develop a healthy attitude of personal responsibility toward his environment and its resources, and to provide him with the concepts, the knowledge and skills needed to contribute validly to the decision-making process on issues involving the environment and its resources. In all grade levels, environmental facts should be taught as they relate to each other, not as isolated bits of information. Children should become aware of the interrelated nature of living processes. Conservation is not an isolated subject and, therefore, cannot be dealt with in a vacuum. It deals with the scientific and long-term management of biological systems for human benefit. Conservation education requires understanding of all environmental and socio-economic systems and their relationships. Forest management and related land use, for example, can then be placed on a sound and enduring basis so that man can both use and retain his rich heritage of natural resources.

The Committee recognizes that the enlightened conservation conscience we are seeking to develop cannot be created by a single course offering, but must be developed progressively throughout the entire school experience. State law now requires conservation instruction in grades one through twelve. We would further suggest that an understanding of the interrelationships of nature be included in pre-school and Headstart programs whenever possible. It is also important that conservation instruction be carried on in vocational training schools and colleges. Although the major subject areas in which conservation concepts would be stressed would be the natural and social sciences, the possibilities for integration into other subject areas should be fully exploited.

This discussion of conservation education presupposes an informed teacher. The committee recognizes one of the greatest problems in the field of conservation education today is the teacher who has little or no knowledge of the field. Therefore, we consider preservice and inservice training to be the cornerstone of any effort to upgrade conservation education.

The recommendations made here look forward to an electorate that will dedicate its efforts to healing the scarred land, protecting our great natural beauty, enhancing and preserving the amenity of neighborhoods and building balance and beauty into the cities of the future.

Massive educational programs for teachers and students, equal in weight to the present and projected assault on our resources and the quality of our environment, is the purpose of this report. There is little time remaining to solve these problems. This Committee sees no miracle panacea nor technological breakthrough on the horizon. An informed public working for the common environmental good through its democratic institutions, while there is yet time, can be the only answer. Our society, our governmental structure, our environment, our community values and ambitions are only as good as we, the members of that society, choose to make them.

From Section II, Basic Philosophy and Definition of Terms

THE SCHOOL PROGRAM

General Considerations

The basic goal of any conservation education program should be the development in students of an understanding of their environment and a feeling of personal responsibility for maintaining its quality. Unfortunately, people often speak of conservation as something others should be doing, when really it is something everyone must practice if we are to continue living on earth with any degree of health and comfort.

One of the shortcomings of past conservation education programs was that the emphasis was placed on resources and problems far removed from the student. The farmer caring for his soil, the forester carefully managing the forest were, and still are, important concepts to which children must be exposed, but what of the student's immediate environment and his personal relationship to it?

For more than 90 per cent of all Californians, "immediate environment" means an urban area. Thus, to be truly relevant to the majority of our citizens, a study of conservation must include consideration of urban as well as rural ecology. As children develop, their interests and awarenesses grow from the immediate environment of the bassinet to the home, the community, the state, the nation, the world, and finally, the universe. A child's conservation conscience should likewise develop as a part of this ever-expanding sphere of interest and knowledge. He should be shown each step of the way how he personally relates to his own environment so that he might learn to put his own ecological house in order before going forth to save the universe.

Another shortcoming of past conservation education programs was the all too common practice of studying resources as if they existed separately. For example, soil, water, animals and plants were studied as if each existed in a vacuum. Seldom did earlier conservation studies deal with the interrelationships of resources or with the interdependencies between man and the resources. If children are to develop adequate conservation consciences, their knowledge about the world must include awareness and understanding of ecological relationships and the effect of human activities upon these relationships.

The Committee recognizes that conservation is basically a social concept. Decisions regarding man's use of the environment must be based on economic feasibility, social acceptability and political reality. The findings of the so-called pure sciences provide needed information and knowledge about the world, but decisions concerning actions to protect, utilize and

preserve the environment and its resources are a function of society and must be studied in the social sciences and humanities curriculum. Because of the possibility of controversy in dealing with social and political matters, extreme care should be used in developing conservation education programs to avoid the danger of making the classroom a "soap box" for any one point of view.

In general, then, school programs must provide conservation experiences in many subject areas throughout the entire school curriculum and in every grade level. We would hope that each graduating student will have a thorough grounding in basic ecology, resource technology and the social sciences as they relate to resource and environmental problems upon which to base a personal conservation ethic. These experiences must deal with the environment in an integrated way and must be as relevant to modern urban dwellers as to rural students. Varied programs to meet the needs of a varied population must be designed. Of particular significance in a good conservation education program is the utilization of the environment outside the classroom. Such experience need not always be of an extended "field or study trip" nature to be of value. Neighborhood nature study walks and short trips to study a local conservation problem such as a polluted stream, a badly eroded hillside, a smoking factory or an area of urban blight can be most effective. Good examples of wise-use resource development and management should also be sought out and studied.

An extended outdoor study experience can also be a very effective part of a total conservation education program, particularly when it is closely related to the ongoing classroom activities. Such an outdoor program, among other benefits, provides children with an ecological base-line or point of reference which they will find necessary in evaluating the various environments which man has modified. Resident outdoor schools and other field study experiences should ideally include study of mountain, seashore, desert, agricultural and urban environments. Existing programs of this type should be expanded and new ones encouraged with financial assistance from the State. A natural study area on a local school site can be a most effective conservation teaching device. A number of school districts are establishing such areas and it is hoped that this trend will continue. Ideally, such areas should be included in the master architectural and landscaping plan of a school.

Finally, an effort must be made to enable children to practice conservation throughout the entire educational process. The most elaborate and expensive program imaginable is valueless unless it creates the desired behavior patterns in children. Some suggestions to build such behavior patterns are:

- Encourage children not to waste food, supplies or other materials.
- Encourage children to help keep their immediate environment (school, home, neighborhood) clean, neat and attractive.
- Help students to discover if they might be a source of environmental pollution. If so, discuss remedies.
- Encourage student organizations to participate in local environmental improvement or conservation programs.
- Encourage students to contact industry, government agencies and private conservation organizations for information on specific conservation problems.
- Encourage high school or junior college science students to act as guides for nature study field trips for elementary students.

DEVELOPMENT OF THE LOCAL PROGRAM

A good school program in conservation must be integrated in all appropriate subject areas in the curriculum at all grade levels. The sciences can provide factual knowledge to help the pupil understand the complexities of the natural world while the social sciences can provide the means to understand the political, social and economic aspects of conservation. A study of the social sciences also helps the pupil understand the democratic processes through which individuals can work together to preserve and enhance their environment. An excellent curriculum must integrate the ideas and concepts from the various subject areas in such a way as to help each pupil fully understand and appreciate man's interrelationships and dependence on the material world. Other curricular areas such as practical arts, mathematics and language arts offer conservation teaching possibilities. In particular, the humanities should be utilized to sharpen the child's natural awareness for beauty so that he may seek to preserve and perhaps create beauty in the natural and urban environments.

In addition to the inclusion of conservation concepts throughout the regular school program, a special course at the secondary level to tie all of the various concepts together should be required for all students.

Concepts and knowledge from a great variety of subject areas should be utilized in developing conservation education units, guides and other teaching material. The State Department of Education, colleges and universities, county and district personnel should provide the expertise required to develop such materials. A good program should include instruction about the basic principles and techniques of resource management and environmental control which will enable people to initiate and support wise environmental management activities. A close working relationship between educators and persons in positions of responsibility in resource utilization and management is essential in devising educational programs to secure these understandings.

From Section III, The School Program

ENVIRONMENT

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OBJECTIVES

There is a vital need for an educational approach that effectively educates man regarding his relationship to the total environment. Environmental education is aimed at producing a citizenry that is knowledgeable concerning the bio-physical environment and its associated problems, aware of how to help solve these problems, and motivated to work toward their solution. Its major objectives are to help individuals acquire:

- A clear understanding that man is an inseparable part of a system consisting of man, culture, and the biophysical environment, and that man has the ability to alter the interrelationships of this system.
- A broad understanding of the biophysical environment, both natural and man-made, and its role in contemporary society.
- A fundamental understanding of the biophysical environmental problems confronting man, how these problems can be solved, and the responsibility of citizens and government to work toward their solution.
- Attitudes of concern for the quality of the biophysical environment which will motivate citizens to participate in problem solving.

Objectives from "The Concept of Environmental Education," Environmental Education, *Fall, 1969, pp. 30-31.*

DISCOVERY APPROACH

Students should experience firsthand activities in the outdoors related to a variety of subject areas. Teachers should ask focus questions to help children discuss their experiences in order to assimilate and organize their conceptual structure. As an outcome, the learner will be able to state a concept derived from his own active observation of data. He will further be able to generalize about relationships among these concepts.

SCIENTIFIC METHODS OF INQUIRY

- The learner is able to draw his own learnings from experience.
- The learner is able to realize that each discipline such as science, mathematics, geography, sociology or anthropology is more than a body of facts. It is a structured and directed way of asking and answering questions. The process disciplines the form of human curiosity.
- The learner is willing to question the claims of authority.
- The learner is able to recognize a problem, use sources of reliable information, observe objectively, compare phenomena, understand systems of classifications, measure, experiment, evaluate evidence and draw conclusions.
- The learner analyzes the spread of the learning situation by identifying the objects, their properties, conditions and events; determining the relevance of these variables; and hypothesizing about what he has observed.
- The inquiry method relates to many curriculum areas, i.e., discovery techniques to social studies, communication to language arts, measurement to mathematics.

PROCESS OF TEACHING

The process of teaching about the biophysical environment and its associated problems, and developing an awareness and motivation to help solve these problems can involve certain process elements. A program of instruction in environmental education should develop at the appropriate grade level the student's ability to observe, compare, classify, investigate, sample, generalize, define, communicate, value, infer and decide.

Observe

- Involve all senses: being able to see, hear, feel, taste, smell.
- Sharpen perception through instruction in the use of clearly defined concepts that improve the student's ability to observe. Remember each observer brings a background of experience and meaning that influences what he perceives.
- Include any relevant facts and features of any objects, events, phenomena or behavioral patterns that are being observed.

• Use tools and instruments that heighten acuity and extend observational power: microscopes, recorders, detectors, telescopes, meters, analyzers.

Compare

• Note similarities, differences of any objects, events, phenomena or behavioral patterns.

• Make sensory comparisons.

• Measure, using appropriate instruments such as rulers, scales, balances, meters and timers. Comparisons can be made of relative position, length, weight, capacity and quantity.

• Analyze identities and contrasts.

• Make prolonged comparison of observed events with one's own experience.

Classify

• Involve sequencing, ordering and grouping.

• Put similarities together in categories. This creates order and meaning in an otherwise chaotic confusion of sensory impressions.

• Create constructed classes of objects, events, phenomena or behavioral patterns.

• Most classifications are contrived by man as scientific tools: taxonomies, groupings, tables, coding, keys, sets.

• Extend and sharpen a class that is already perceived and being used.

Investigate

• Use firsthand experience as an essential element. Investigation is searching and inquiring in order to ascertain facts. It involves a detailed and careful examination of things observed.

• Stress many different sources of information.

• Teach techniques of investigation in many subject areas.

• Involve the application of reasoning, interpreting, associating and seeing relationships of the subject being studied.

• Encourage self-directed action motivated by interest and curiosity.

Sample

• Collect sufficient data to serve as a representative sample of a whole.

• Use a part for purposes of investigating and comparing the properties, quality or character of any objects, events, phenomena or behavioral patterns.

• Become familiar with and use a variety of sampling techniques.

Generalize

• Interpret data.

• Generate and test hypotheses. A hypothesis is an idea not yet proved (or disproved) by any combination of known facts.

• Formulate experimental hypotheses.

• Formulate and test models. A model visualizes something that cannot be seen in order to deal with it effectively.

• Control and manipulate variables (conditions). We can isolate the experimental factor by comparison or involve no controls at all by relying on counting, measuring or direct observation to determine the effects of the experimental factors.

• Make predictions. This need not involve the cause-and-effect relationships often expressed in a well-stated hypothesis.

Define

• Formulate one or more precise statements of meaning. In the definition itself the scientist carefully states the operations by which the thing defined may be identified, detected or measured. In the studies of man a definition given in terms of observed behaviors is similar to an operational definition in the sciences. A definition may also be sharpened and refined to improve its usefulness for future processes of inquiry.

Communicate

• Use all the communication skills and devices to convey information and ideas to others: listening, speaking, reading, writing, and pictorial representation.

• Develop precision in communication by real or abstract means. Use maps, diagrams, graphs, tables, formulas and mathematical notations, still pictures and movies.

• Use the most appropriate means for the information to be communicated.

• Learn to translate from one communication means or language to another.

Value

• Identify, examine and refine the relevant values that relate to the problem or question. This may involve a redefinition of the problem.

• Examine the relevant values as they relate to each other and to the investigator's value system as a whole.

• Seek alternatives on the basis of alternative values to be realized. Examine their effect upon the value systems of the individual, group or society.

• Establish priorities among the alternatives which exist.

Infer

• Derive meaning from indirect evidence.

• Combine reasoning with observation and investigation to make intelligent guesses from clues. Facts can be assumed for informational purposes.

• Avoid over-generalization. This may occur when an observer tries to apply a concept or generalization to a phenomena which is dissimilar from the one he has previously examined.

Decide

• Come to a conclusion.

• Examine the alternate decisions which are possible, using the information and values being considered.

• Arrive at a rational choice or solution whose projected consequences, as judged by the relevant information, are most consistent with the relevant values.

ACTION PROGRAMS

There are many exceptional programs in Alameda County related to the study of the environment. This section includes representative examples of recent district and County activities. Included are information and photographs of the EPDA Project, *Environmental Learning Experiences for Elementary School Teachers;* a district outdoor education program; outdoor classroom areas; use of the school grounds; day field excursions; outdoor resident schools; and special programs and activities.

ENVIRONMENTAL LEARNING EXPERIENCES FOR ELEMENTARY SCHOOL TEACHERS

During the fall and early spring of 1969-70, 210 elementary school teachers in Alameda and Contra Costa Counties attended workshops in environmental education. The 14 one-week workshops were held with 15 participants each week at five park sites of the East Bay Regional Park District - Tilden, Sunol Valley, Coyote Hills, Alameda Beach and Briones.

Participants learned how to use the outdoors as an integral part of the elementary school curriculum. They were introduced to these unique park areas as model extended classrooms, exploring the available teaching resources, and applying these experiences to other natural areas. Special emphasis was on the environmental features and problems of the San Francisco Bay Area.

Teachers from 31 school districts in the two counties were involved in the workshops. Dr. Esther Railton, Associate Professor of Education, California State College, Hayward, was the course instructor. Naturalists from the East Bay Regional Park District were used each day as resource instructors. They included Joshua Barkin, Dick Angel, Joanne Dean, Ron Russo and Tim Gordon.

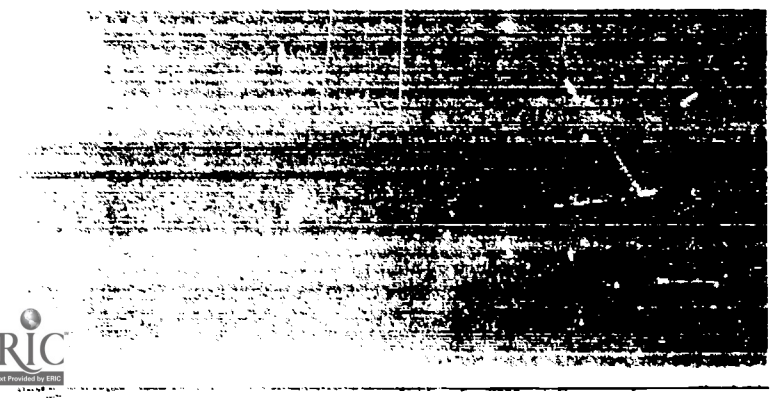
The project was supported by a grant from the United States Office of Education under the Education Professions Development Act (EPDA). It was a cooperative proposal of the Alameda County School Department, the Contra Costa County Department of Education, the East Bay Regional Park District and California State College, Hayward. Donald Lundstrom, Science Coordinator, Alameda County, was director of the project. Dr. William Landis, Science and Mathematics Coordinator, Contra Costa County, was associate director.

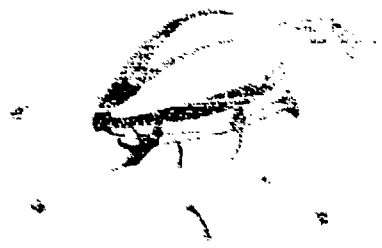
Specific Objectives

- To become aware of the outdoor natural areas of Alameda and Contra Costa Counties (East Bay) in the San Francisco Bay Area as model extended classrooms, exploring all of the teaching resources of the public areas and applying the experiences to other natural areas.
- To recognize environmental problems of the San Francisco Bay Area to which children can be introduced and to identify the means available to citizens to do something constructive about these problems.
- To identify the factors in the outdoors which can be used to enrich the curriculum of the elementary schools (K-8).
- To identify the examples from and applications to the pupils' environment which can vitalize the classroom teaching technique.
- To compare and relate the outdoor and indoor instruction in environmental education.
- To identify the excursion procedures for different types of outdoor instruction.
- To recognize desirable health and safety procedures.

Five park sites
in the East Bay
Regional Park District
were used each week
for the learning experiences.

FIRST DAY





CHARLES LEE TILDEN REGIONAL PARK
2,065 acres, located behind Berkeley, Alameda and Contra Costa Counties. Tilden Park is the oldest, most developed, and most used of the regional parks. Tilden is a contrived environment in many respects: it includes a nature area, little farm, museum, the Botanic Garden of Native California Plants. The outstanding natural features are Lake Anza, Jewel Lake and Wildcat Peak.

Daily Schedule:

8:30 a.m.
- Browse, examine curriculum materials, get acquainted

9:00
- Make name pins
- Orientation - goals, expectations
- Introduction of staff, guests, participants
- Distribute materials
- Register for course - assignments
- Song session - poems, introduction to Tilden Park
- Committees for Friday cookout

10:00
- Place shadow stick
- 100-inch discovery hike using senses
- Weather station
- Nature back pack - exploratory session

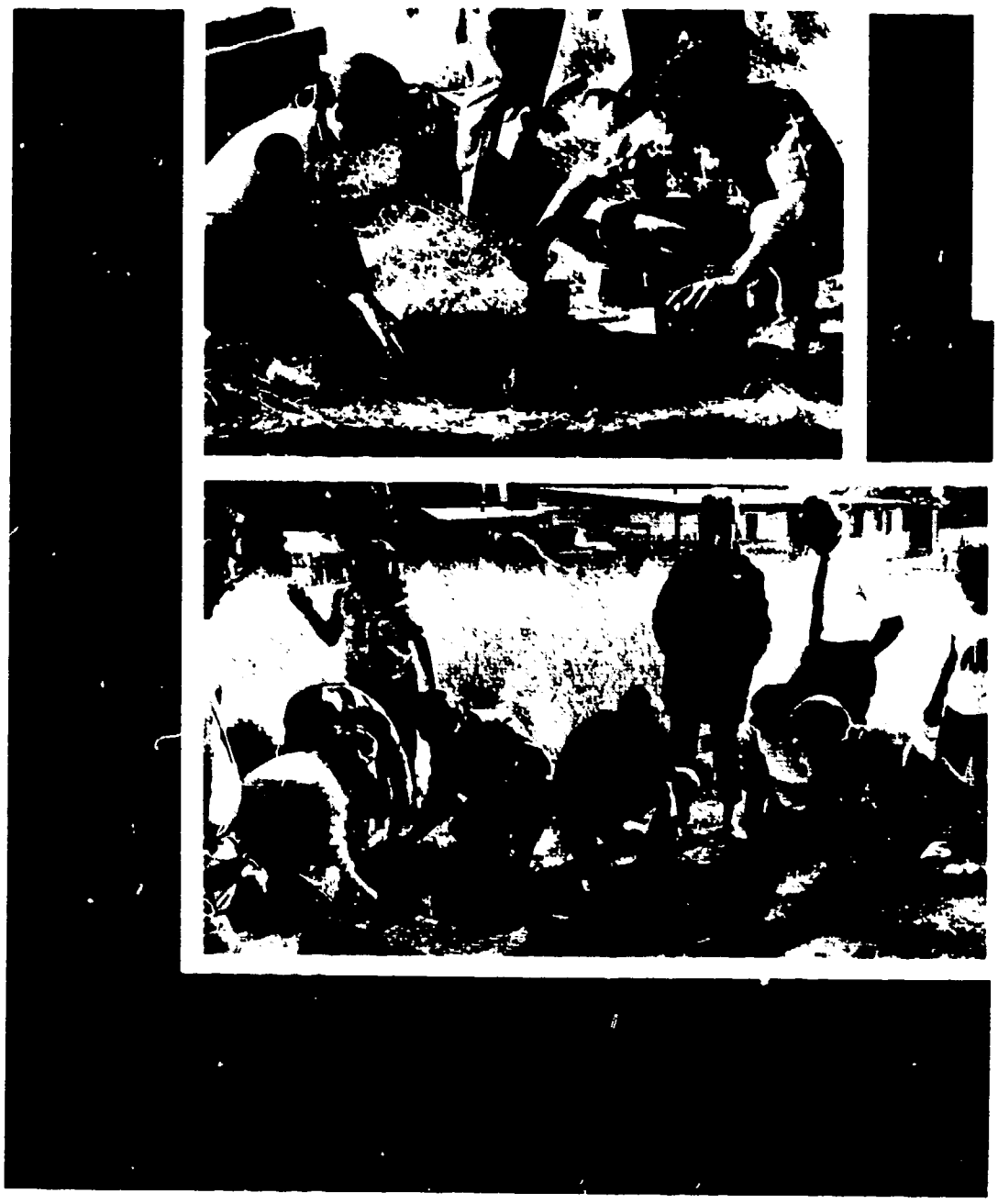
11:00
- Evaluate morning in terms of application to curriculum

11:30
- Lunch

12:30 p.m.
- Use of puppets - skits
- Use of shadow stick - sun dial
- Reading compass - following compass course
- Use of relief maps
- Exploratory walk to Jewel Lake using compass
- Reading bird key - tree key

2:30
- Evaluation
- Stress health and safety outdoors
- Plans for second day

SECOND DAY



SUNOL VALLEY REGIONAL PARK

3,870 acres, located in southern Alameda County. Sunol Park is a rural-open environment **which has changed little since the days of the** Spanish dons. Through the years the area remained private ranch land until purchased by the park district. Outstanding natural features are Alameda Creek, steep grassy hills, groves of wild oak, Flag Hill and McGuire Peak.

Daily Schedule:

8:30 a.m. ● Browse, examine curriculum materials

9:00
- ● Songs, introduction to Sunol Park
- ● Make adobe brick
- ● Introductory excursion
- ● Self-discovery trail

11:00
- ● Environmental techniques - discovery and inquiry
- ● Problem solving through direct experience
- ● Environmental problems of range land

11:30
- ● Lunch
- ● Individual pursuits visiting educational displays

12:30 p.m.
- ● Game
- ● Making and using a transit
- ● Measuring stream flow
- ● Studying stream ecology

2:30
- ● Curriculum review
- ● Plans for third day

COYOTE HILLS REGIONAL PARK

1,000 acres, located adjacent to the San Francisco Bay in Fremont, Alameda County. Much of the uniqueness of Coyote Hills Regional Park is due to the diversity of resources available. The large marsh offers a chance to observe a variety of wildlife in a natural situation. Many creatures, both large and small, can easily be seen. Coyote Hills also offers a unique opportunity to visualize how the Bay and surrounding mountain ranges were formed millions of years ago. From the tops of these lonely peaks, one can overlook the world he knows as the Bay Area and get a bird's eye view of his environment. Other outstanding features are the Indian Mounds and Stanford Research Institute facility.

Daily Schedule:

9:00 a.m.
- Songs, introduction to Coyote Hills
- Exploratory excursion - 5-senses hike
- Color in nature
- Marsh ecology, hill ecology
- Vista of bay
- Bay Area environmental problems - bay fill
- Creative writing outdoors – vocabulary, poetry, vista point stories
- Children's literature about the outdoors

11:45
- Lunch

Stanford Research Institute facility

1:00 p.m.
- Indians of area
- Indian game - stalking game
- Trip to Indian mounds

2:30
- Curriculum review - social science community and culture study
- Plans for fourth day

THIRD DAY

ALAMEDA MEMORIAL STATE AND REGIONAL BEACHES

155 acres, located on the San Francisco Bay in Alameda, Alameda County. This park has several habitats to explore: a bay rocky shore, a mud flat, a sand flat, and, intermittently, a brackish vernal pond. It also has an interesting historical background. It offers two miles of public access to the shores of San Francisco Bay. Alameda Beach is close to the "core city"; there is good public transportation.

Daily Schedule:

9:00 a.m.
- Songs, introduction to Alameda Beach, local history
- Bay shore ecology
- Reading tide tables - beach key
- Environmental problems - noise, air, water pollution, litter, transportation, and housing

11:00
- Vocations and careers
- Evaluation

11:30
- Lunch
- Individual pursuits - visit to park exhibit

12:30 p.m.
- Role playing game - interdependence, food chain
- Mathematics in nature's design -
- Fibonacci numbers
- Make art object using some materials from nature (clay, sand, driftwood, shells, seaweed, stones, etc.)

2:30
- Curriculum review
- Plans for fifth day

BRIONES REGIONAL PARK

3,057 acres, located in western Contra Costa County. Briones Park is basically an undeveloped park area. The rolling grassy hills and wooded slopes provide an excellent natural setting. A historial aura of the "Rancho Boca de la Canada del Pinole" days is present in this park, which preserves a small section of Briones' original rancho. The history of the land and its use prior to the arrival of masses of settlers and the development of modern communities is an inherent part of the park's story. One has the opportunity to see land as it was in the 1840's, relatively untouched in all the years since.

Daily Schedule:

9:00 a.m.
- Songs, introduction to Briones Park
- Edible plants
- Indian plants and dyes
- North/south slopes, meadows and forest ecology
- Techniques to use with children outdoors
- Wooden whistles

11:00
- Use of undeveloped park, urban growth and park lands, resident schools

11:30
- Lunch - cookout, prepare sample of wild plant food

12:30 p.m.
- Plant dyes with native material
- Participants demonstrate and teach a lesson related to curriculum in the outdoors

2:30
- Evaluation
- Back to school ideas
- Areas of need

[redacted]

A Key to the Common Birds of Tilden Regional Park (free on pick-up, 10¢ mailed)
Discovering Color in Nature–an instructive coloring book (5¢ on pick-up, 15¢ mailed)
Educator's Guide to Alameda Beach Regional Park ($1.00 on pick-up, $1.25 mailed)
Educator's Guide to Coyote Hills Regional Park ($1.00 on pick-up, $1.25 mailed)
Educator's Guide to Sunol Valley Regional Park ($1.00 on pick-up, $1.25 mailed)
Educator's Guide to the Tilden Nature Area ($1.00 on pick-up, $1.25 mailed)
Hiker's Map of the Tilden Nature Area (free on pick-up, 10¢ mailed)
How to Live with a Rabbit and *How to Live with a Guinea Pig* (either pamphlet 5¢ on pick-up, 15¢ mailed)
Let's Visit the Little Farm (free on pick-up, 10¢ mailed)
***Magic World of Mushrooms* (35¢ on pick-up, 45¢ mailed)**
Old California Fire Machinery (10¢ on pick-up, 20¢ mailed)
Parks Are for People–descriptive folder of East Bay Regional Parks (free)
Self-Guiding Nature Trail Booklet, Jewel Lake (25¢ on pick-up, 35¢ mailed)
Survival Plants of the East Bay (25¢ on pick-up, 35¢ mailed)
The Housewife's Environmental Handbook (25¢ on pick-up, 35¢ mailed)
Tilden Nature News–a quarterly newspaper (distribution and costs by arrangement)
Trail and Road Maps of Tilden, Redwood, Sunol and other Regional Parks (free on pick-up, 10¢ mailed)
Welcome to the Little Farm (10¢ on pick-up, 20¢ mailed)

[redacted]

The teacher will be able to:

- Be involved in sensory exploration to make him aware of the living and non-living environment.
- List five of the available natural outdoor areas available in Alameda and Contra Costa Counties.
- State three potential teaching opportunities at each of the five regional park sites used.
- Provide five learning experiences selected from the week's activities that can be carried back to the school environs.
- Plan five activities for his classroom based upon the environmental learning experiences.
- List specific behavioral objectives for each of the five activities.
- Utilize competencies and skills available from the community should these competencies and skills be available.
- Direct the classroom experiences in terms of the readiness of the pupils, using concrete learning experiences in the lower grades and among the educationally and culturally disadvantaged. The discovery method will be used instead of "telling" the pupils.
- Pre-plan at least one field learning experience, i.e., preparing the class, making administrative arrangements and carrying out the learning experience.
- State ten objectives of the field learning experience in behavioral terms. Upon return, a test based upon the above stated objectives will be administered to the pupils. It will be expected that all pupils will obtain a score of 50% or higher.
- List 20 desirable health and safety procedures.
- Plan a unit for the classroom on health and safety procedures in the outdoors stating his objectives in behavioral terms. Pupils will be able to pass an objective-type test with scores of 50% or higher.
- List five major environmental problems in the San Francisco Bay Area.
- Name the organizations and people to whom he can refer for help in regard to the environmental problems of the San Francisco Bay Area.
- Plan a simulation lesson (role-playing) based upon the controversial views as to how the Bay Area should be used. Available sources such as newspapers, organization brochures, local and state agencies will be used.
- List ten vocations and careers related to the outdoor natural areas of California.
- Plan an "Outdoor Careers" day for the pupils, inviting available representatives from local sources to speak and participate, e.g., forestry agents, fish and wildlife agents, conservation men, marine biologists, etc.
- Plan an outdoor unit which integrates science, mathematics, social science, and reading objectives in one central activity. (Note: any combination of subject areas could be used.)
- State the objectives of the activity in behavioral terms for each subject so that both teacher and pupils can see how the activity will integrate the four areas.

Castro Valley's Clifton School

OUTDOOR EDUCATION PROJECT

The outdoor education project is successful because it is a team effort combining many skills and supported by children, parents, teaching staff, "experts" and the community.

The students tramped the site adjacent to the classroom buildings, looked at the soil erosion and bare ground, and decided what they would like to "find out there" and what they would like to "do out there." The Clifton Student Council made plans to make their ideas come true.

Phase I included soil study, drawing plans, providing berms for drainage to control water flow, installing water systems and adding land fill and topsoil.

Phase II embodied the planting of a Clifton family forest of evergreens, a chaparral zone in native shrubs and plants, a desert area, deciduous fruit trees and the lawn for a school amphitheater and stage. (It has taken two years to accomplish Phase I and Phase II.)

Phase III comprises most of the "Do Ideas": nature trails and paths, benches, totem poles carved by the students, observation deck, bird feeding stations, bird baths, student-made sundial, sandbox for creating, wild flower beds and experimental plots.

Phase IV will be the creation of a pond for small fish and water life with a bridge over it, maybe even a small waterfall.

All of these ideas are being accomplished because of the cooperation from children, parents, staff, the soil conservation service, science coordinators, native plant specialists, local nurserymen and fathers skilled in the trades. Funds came from the Parents' Club, school student council activities and donations.

The school district office's assistance included berm installation, pipe layout, loan of equipment to drill and fill, plus some man hours at special times. Other assistance was provided by parents, students, staff and friends who supplied designated specimens in the plot plan, donated time and film for movies and pictures, and food and refreshments on work days.

Good communication was maintained between everyone involved in the project: students met with the Parents' Club Executive Board; student body officers made regular progress reports at the Parents' Club meetings; the student body president kept homes informed via progress memos; a scrap book was made with pictures of all events, newsclippings, bills paid, lawn seed mixture, plant tags, plot sketches and planting map.

DISTRICT OUTDOOR EDUCATION PROGRAM

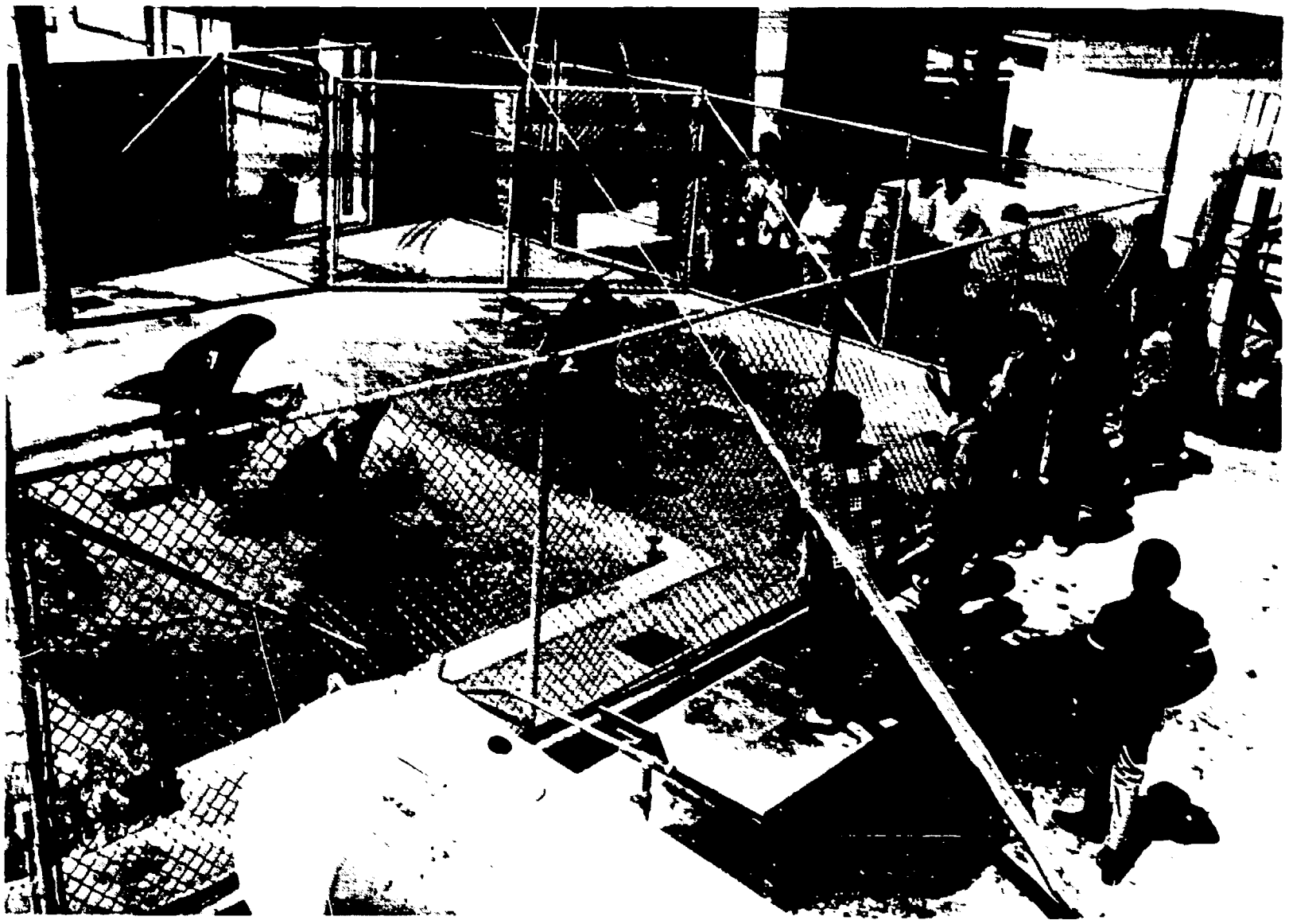
Outdoor education has been an important part of the Emery Unified School District's program for the last six years. It was first offered during the summer months in conjunction with summer enrichment programs in the form of day camping for primary students, residence camping in the Sierras for intermediate students, and overnight marine biology studies for senior high students.

Under the direction of Mrs. Neena Lyon, Coordinator and Director of Outdoor Education, the program has become an integral part of the ongoing curriculum at the primary and intermediate levels. Conservation and ecology studies are emphasized for students from pre-school through the sixth grades. Teachers are provided with direct classroom preparation and field study assistance from the program's full-time naturalist, Curtis Jones, who supplies resource material and conducts the field experiences. Through careful planning and scheduling each class receives four field studies per school year, including pre- and post-classroom work.

During 1969-70, outdoor education studies focused on environmental issues that the teachers and naturalist identified as most desirable to develop and incorporate into the curriculum. The basic conceptual schemes stressed ecological relationships of man in his environment and became the connecting link that provided continuity throughout the program with upper grades more involved in in-depth study of these basic concepts. Since knowledge of eco-systems and communities is essential in the environmental study, field trips are planned to provide firsthand experiences. Starting with the children's immediate neighborhood and the Emeryville community, additional studies are conducted to include bay, marshland, forest, chapparal, coastal, marine and delta communities. Activities during each field study vary according to grade level objectives.

A variety of learning experiences are included in the outdoor education program. As a result of a study of trees, second graders visited a tree farm to select their own Christmas tree and included a number of measurement activities as a part of their field experience. In addition, children make feeders (pine cones filled with suet and seed) to leave as presents for the birds. Fifth graders, studying weather, used a portion of their field trip to Coyote Hills to carefully record the data observed with the aid of weather instruments (both manufactured and student-made). Fourth grade students reviewed their day's experience at Sunol Park by listening to a tape recording that they made while in the field and used this as a means to further develop language activities, both written and oral. A third grade class culminated a marine biology trip to Alameda Beach with a sand-casting activity. A comparison of climatic conditions on different forms of plant life was made by students visiting the University of California Botanical Gardens. Children were given plant samples to bring back for individual terrariums to study and contrast varying conditions on those diverse plant forms that would exist in the desert, rain forest, etc.

Emery Unified School District



Summer study for intermediate students (Grades 5 through 8) provides an opportunity for comparing the Sierra ecology with that of the Bay Area. In addition, this week-long outdoor education camp offers studies in astronomy, riparian and biotic communities, geology and early California history.

In summary, the outdoor education program in Emeryville has become an important way of life for its students where the key phrase is "learning through discovery." Field studies provide those firsthand experiences that facilitate children's learning from pre-school through intermediate grades, and offer enough variety and flexibility in many aspects of the curriculum to motivate and encourage students' learning.

OUTDOOR CLASSROOM AREAS

There has been a great deal of interest in the development of outdoor classroom areas on school sites during the last few years. Whether they are called nature centers, conservation education areas, outdoor learning laboratories, outdoor school sites or nature parks, they serve to bring the student out of the classroom to study his natural environment at firsthand. Such classroom areas can be used for all subject areas since they should be an extension of the indoor classroom. They should also be planned for use all during the year utilizing the seasonal changes. The entire school community – students, staff and parents – should be involved in the planning and development.

Samples of existing environments can be preserved or new habitats created. Any section or corner can be changed into a valuable teaching area. Don't ignore the courtyards, elevated land, borders, lawns, parking lots or paved areas. Each can serve a special need.

A variety of environments is possible, each depending on the school site. One can consider any of the following ecological regions which are found in California: coniferous forest, northern rain forest, grassland, desert, and broad-leaf evergreen forest and scrub. Water and wetlands are also an interesting addition to any outdoor classroom area.

The following procedural steps are suggested for developing an outdoor classroom area:

- Establish an outdoor classroom area committee.
- Collect resource materials on conservation and school ground planning.
- Use state and federal agencies to provide technical assistance, e.g., the United States Soil Conservation Service.
- Map and inventory the entire site.
- Review the inventory with resource consultants and groups.
- Prepare a detailed long-term plan.
- Publicize the program.

Elementary and secondary schools have used such steps to plan and develop their own sites. Outdoor classroom areas are presently being developed and used in Berkeley, Castro Valley, Fremont, Livermore, Murray, Pleasanton and San Lorenzo School Districts.

Castro Valley's Clifton School

DESCRIPTION OF PLANTING DAY – FEBRUARY 15, 1970

by Alan Luna,
Student Body President

I thought that our first planting day was a real success. Everybody that went out to work, worked really hard and we got every tree and bush planted.

The district brought an auger which drilled holes for us. We shoveled the dirt out and mixed it with conditioner before planting. We staked the trees, then added a little strap that went around both the trunk and stake to hold the tree straight.

After everything was planted we watered well and then it started to rain. Believe it or not, we planted: 3 silver maple, 5 toyon, 10 birch, 10 pine, 5 pyracantha, 1 oak, 1 incense cedar, and 1 arctostaphylas. Two people donated $5.00 and others donated stakes. During planting day our best worker, Mr. Wescott, got blisters all over his hands. All of the kids that went out had a good time helping and Mr. Neavill took some movies. Our plans call for additional specimens so that we will be able to learn to appreciate and identify many varieties of shrubs and trees. We still have hopes of planting some of the following on March 6th, our Arbor Day celebration: madrone, fremontia, mexicona, arctostaphylas, ceonthus, manzanita, sage, bay and strawberry trees.

March, 1970

Dear Parents:

The newly planted birch trees are leafing out and the fruit trees are blooming. It is all very exciting because it is ours. We still need the following shrubs and trees: manzanita, bay, madrone, redbud, ceonthus – but the holes are filling up!

Alan Luna,
Student Body President

OUTDOOR CLASSROOM AREAS

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Marsh, Norman F. *Outdoor Education on Your School Grounds.* The Resources Agency, Sacramento, 1968.

Michigan Department of Education. *The Community School Site – A Laboratory for Learning.* Lansing.

Watts, Tom. *California Tree Finder.* Nature Study Guild, Berkeley, 1963.

Hayward's Bidwell School

USE OF THE SCHOOL GROUNDS

Every teacher has the school grounds and immediate surroundings to teach about the environment. Dan Brown, Bidwell School, Hayward, used decaying redwood chips from an unused playground area to stimulate interest in soil. These investigations developed into a further study of soil and the needs and growth of plants. The 4th grade class began listening every morning to Joe Carcione's radio program, "Produce Market Report" on KCBS. They wrote letters to Mr. Carcione and were very pleased to hear several read on the program.

There are an infinite number of activities and investigations which can be planned whether there is an extensive outdoor classroom area, a regular playground or just plain asphalt.

Here are a few things to consider:

Biological Environment	Physical Environment	Cultural Environment
weeds	concrete	signs
insects	water	posts
seeds	sand	insecticides
flowers	air	windows
tracks	heat	buildings
snails	gases	streets
amphibians	ground contours	automobiles
vines	soil	fences
grass	rocks	vegetation around school
trees	asphalt	playground equipment
birds	color	design of school
vegetables	temperature	population density
leaves	light	quality of community
burrows	odors	
herbs	poisonous substances	
fungi	redwood chips	
microscopic life		

A lesson is everywhere. Use your imagination!

Marianne Hurlbut, photo

DAY FIELD EXCURSIONS

Almost every school provides some type of day field excursion. For some, it is a walking trip to a local neighborhood park, a vacant lot, a hill or a creek area. Others go by bus to a wide variety of facilities and locations such as Alameda Beach, Tilden, Sunol Valley and Coyote Hills Regional Parks, Knowland Park and Zoo, Lake Merritt, Chabot Science Center, Berkeley Aquatic Park, University of California Botanical Gardens or Corral Hollow. There have also been trips to out-of-county sites such as the ocean beaches at Moss Beach and Bodega Bay.

One oceanography class of 7th and 8th graders from Willard Junior High School in Berkeley camped overnight on the beach at Bodega Bay. They studied the plants and animals on the seashore and seined for fish. Their catch included flounders and gobis.

Many schools are making greater use of the community and their surrounding natural resources while studying the environment. One 6th grade class at Lincoln School in Berkeley organized an Environment Committee. As part of the project, they took a field trip to the Berkeley waterfront for a clean-up campaign. They also went to Tilden Regional Park and worked with the naturalists on a similar clean-up campaign. Another group from Columbus School visited the Berkeley mud flats. The 4th, 5th and 6th graders were in a "building things" class, part of a special discovery program.

School districts such as Alameda, Albany, Berkeley, Castro Valley, Emery, Fremont, Hayward, Murray, New Haven, Oakland, Piedmont, Pleasanton, San Leandro and Sunol Glen have used the naturalist services of the East Bay Regional Park District. Students have visited Alameda Beach, Coyote Hills, Sunol Valley and Tilden Regional Parks. Pleasanton School District, for example, has scheduled many daily field excursions to Sunol Valley Regional Park.

A STUDENT-CREATED TRIP JOURNAL

Six pages are suggested, one for each of the following:

- Observations: List living or non-living things that you see, hear, smell or feel. Give location of each item listed.
- Perceptions: Sketch two things that you listed. Give your reactions, favorable or unfavorable, to these two things.
- Comparisons: Contrast things listed under observations by such characteristics as color, texture, shape, size, weight, length, sound, smell, taste, speed, structure, behavior and composition.
- Interactions: List things which are happening to each other.
- Values: List or sketch things of special interest or value to you.
- Inquiry: State any questions or ideas about things that you have observed. These can suggest future research and investigations.

Such trip journals can lead to further action within the class. An enterprising teacher can begin any number of follow-up activities, such as categorizing observations, making map entries for specific things, checking accuracy, making displays, comparing things we "valued," communication and discussion, comparing perceptions, examples of environmental problems, ecology class journal, selected investigation and research, compilation of field evidence and letters, petitions and information to the appropriate agencies.

Additional field excursions can be taken in contrasting weather, at different seasons, at different times of the day and for different purposes.

Suggested by Bay Area Educational Services, National Audubon Society

POLICY GUIDELINES FOR EDUCATIONAL USE OF STATE PARK FACILITIES

The California state park system, through its many physical facilities, and through the expertise of its personnel, represents a potentially great educational asset. Careful planning and cooperation between educators and park personnel is essential if this potential is to be fully realized.

The following guidelines were developed to help establish a close working relationship between educators and park personnel.

Pre-Planning

Selection

- Educators should consider the educational objectives of any visit to state park facilities and should select the facility best suited to their purposes. Local, regional and state park personnel can assist in making such choices. An illustrated folder listing all facilities is available at all state park units.

Reservations

- Advance reservations are essential. Casual "drop-in" visits by classes usually prove to be of little or no educational value, and should be discouraged. Park fees and admission charges may be waived for school groups when advance reservations are made and the school principal certifies in writing that the visit is for educational purposes.
- The maximum value of an educational visit to state park facilities cannot be achieved without pre-planning involving the teacher and park personnel. Points which should be discussed during a pre-planning conference include:

1. The specific educational objectives of the visit.
2. Background information and vocabulary.
3. Age level and specific capabilities of the class.
4. Program participation during the visit by teachers and park personnel. Special programs can often be arranged if advance requests are made.
5. Park rules and regulations.
6. The availability of pre-visit materials. Some units have prepared special packets for school use.
7. Special clothing or equipment which may be desirable.

The Visit

- All parties should be careful to follow agreed upon schedules. If changes cannot be avoided, proper notification is essential.
- Teachers are responsible for the physical control, conduct and safety of their classes. They should accompany the students during the visit and participate in the program.
- Park rules and regulations must be observed by all visitors.

Follow-up

- Proper follow-up activities are an essential part of a good educational journey, and are the primary responsibility of the teacher.
- Park personnel are always interested in seeing examples of student work done in connection with a school visit and welcome student and teacher suggestions on programs and facilities.

Additional Services

- Park personnel can be made available to work with educators in conducting inservice workshops, planning outdoor education programs and serving as curriculum consultants.
- School assembly programs can sometimes be arranged for special occasions.

RESIDENT OUTDOOR SCHOOLS

Interest in resident outdoor schools for both elementary and secondary students has increased during the last few years. Although the number attending such schools is still a small percentage of the total school population, the increases have been substantial. During the last two years students from Berkeley, Castro Valley, Emery, Fremont, Hayward, Livermore and Murray have attended either school year or summer programs. Many districts, such as Pleasanton, have also planned district programs which involved overnight trips to a regional park or outdoor facility. Individual teachers in many districts have also planned overnight programs for their own students.

Murray Elementary School District

RESIDENT OUTDOOR SCHOOL PROGRAM FOR SIXTH GRADE PUPILS

The Murray School District offered a week-long experience to all 6th grade youngsters at Alliance Redwoods Camp near Occidental in Sonoma County. The resident outdoor camp offered firsthand experiences, drawing from all curriculum areas, in a setting that can best be described as a living environmental laboratory. The one-week program was a total educative experience which made use of camping, recreation and education to offer children a learning opportunity in responsible democratic living and in the understanding and wise use of our natural resources.

Staffing

A team of five teachers made up the permanent camp staff. Each week four classes lived and learned together in the out-of-doors, each accompanied by their own classroom teacher. Therefore, there were nine credentialed teachers involved with four classes of youngsters every week. Fourteen cabin counselors were recruited from local high schools to help maintain 24-hour supervision and aid in many of the camp activities.

Cost

Each student needed $30 to cover some of the expenses of the program. Twelve meals were provided during the week beginning with dinner on Monday through lunch on Friday. Heated cabins, showers and lavatories helped to make living comfortable.

Features of the Program

Three trails were used at the camp as children curiously inquired about interrelationships of plants and animals as well as distinct physical features. Folk dancing, starlight hikes and crafts took on a special significance for the camp residents.

Local field trips were planned to Fort Ross, Bodega Bay, Marine Biology Lab (a University of California, Berkeley facility) and Shell Beach. A picnic lunch was provided on this day for youngsters to enjoy in a beautiful outdoor setting.

In the final analysis, the greatest benefit of the resident camp experience was the relationship established between teachers, counselors and students. The setting had a very real therapeutic effect on everyone. Life became more relaxed and less complicated.

Castro Valley's Camp Hammer, 1970

CAMP HAMMER – 1970

As part of a 1970 summer program for students in grades four through seven, the Castro Valley Unified School District operated a program at Camp Hammer near Big Basin State Park in Santa Cruz County. About 70 students attended each week of the four one-week sessions. This was the second summer for the program.

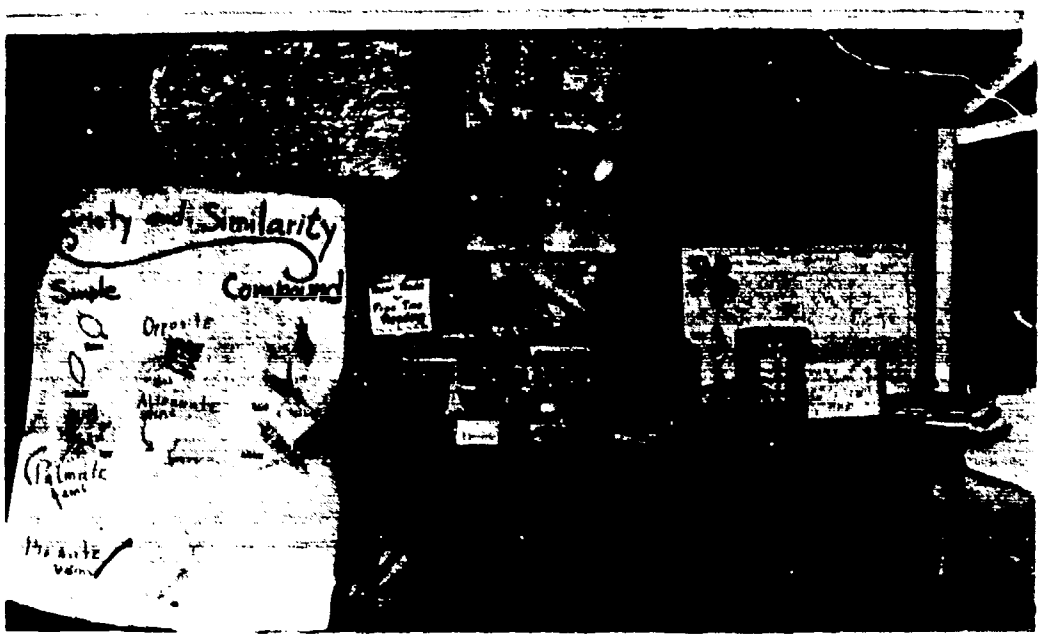
Four experienced classroom teachers along with four student teachers from California State College, Hayward and five student counselors made up the permanent camp staff. Robert Burks, an elementary school principal during the school year, served as camp director.

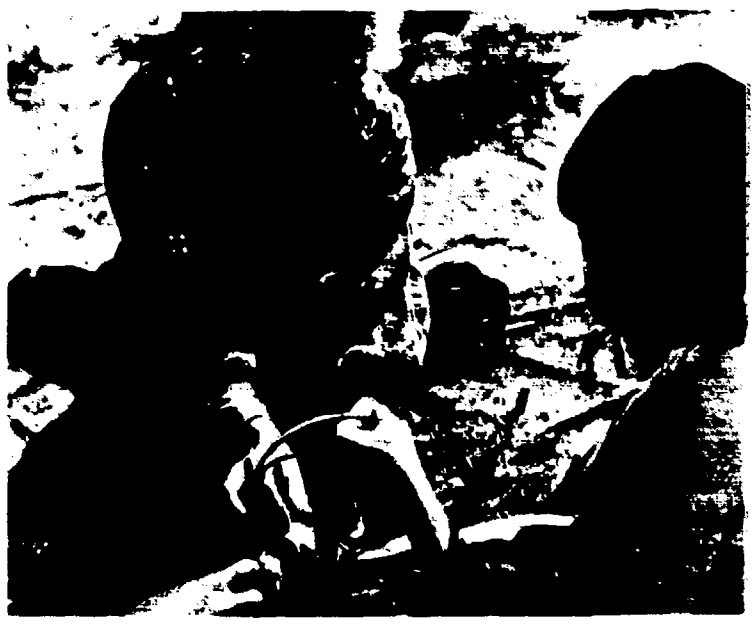
The group experience sessions were developed around five strands identified by the National Environmental Education Development Program (NEED):

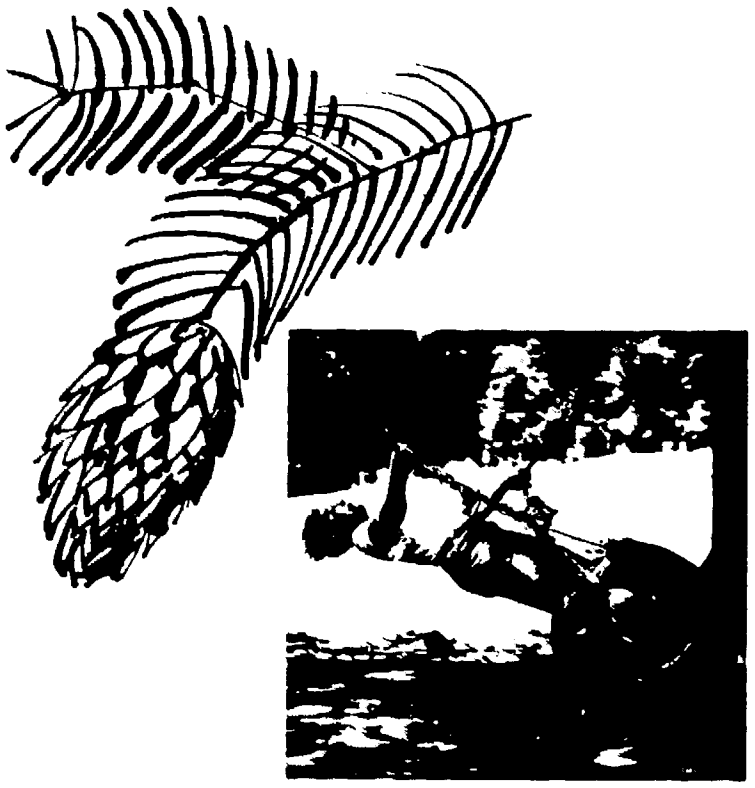
- Variety and Similarity
- Continuity and Change
- Adaptation and Evolution
- Interdependence and Interaction
- Patterns

Activities correlated with subject areas such as biology, ecology, art, music, social science, language arts, physical science, mathematics and astronomy.

The weekly program also included organized recreation, special interest groups, campfire activities and time to enjoy the outdoor surroundings. Students attending for the second year also went on an overnight camp-out.

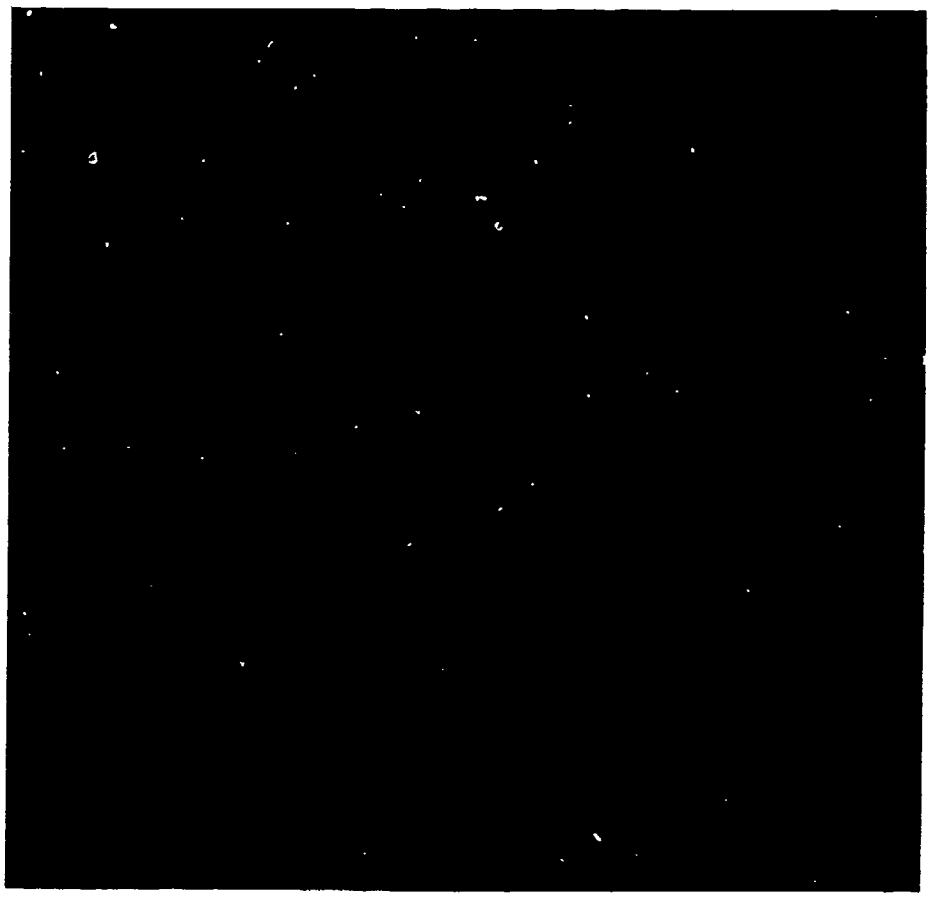






DAILY SCHEDULE OF EVENTS
CAMP HAMMER

7:30-8:00 a.m.	Rise and shine
8:00-8:15	Flag raising and pledge, song; orderly line into dining hall; wilderness words
8:15-8:45	Breakfast
8:45-9:00	Cleanup and prepare for group meetings
9:00-12:00 noon	Camping experience groups (ABCD) sessions
12:00-12:15	Cleanup for lunch
12:15-12:45	Lunch
12:45-1:00	Cleanup, rest
1:00-2:00	Planning time for camp experience sessions
2:00-4:00	Organized recreation
4:15-5:15	Special interest areas (specialty groups)
5:30-5:45	Cleanup for dinner
5:45-6:30	Dinner
6:30-7:45	Counselors available on green for cabin skits, etc.
8:15-8:30	Flag lowering
8:30-9:30	Campfire activities
9:30-10:00	Evaluation of the day with counselors and readiness to rest
10:00	Taps, good night, lights out!



"CALIFORNIA, SAVE IT OR LOSE IT"–
San Leandro Unified's
Gifted Minors Special Program on Ecology

The organization of the elementary (Grades 4-7) gifted minors program for the 1969-70 school year included two components. Classroom enrichment was the major element which was guided by the classroom teacher on a regular basis. The second component was directed to special activities of an educational and/or cultural nature on an out-of-school time basis. These activities were optional to the pupils in the gifted minors program.

As part of the second component, a series of after school and Saturday morning classes began on Friday, March 6, 1970, and concluded May 23, 1970.

The theme, "California, Save It or Lose It,' was chosen for this series. In light of the current concern for the ecology of our environment, it was felt that this theme was both timely and relevant.

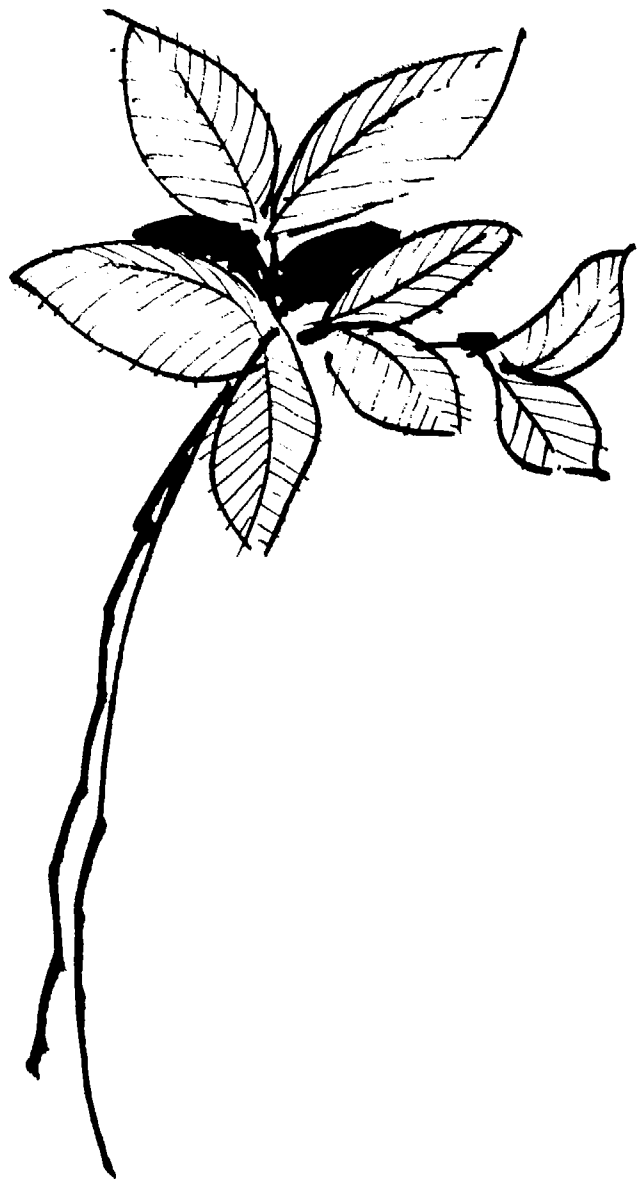
The following schedule outlines briefly the topics and activities included. Several field trips in the Bay Area were planned for this program.

1970 Schedule

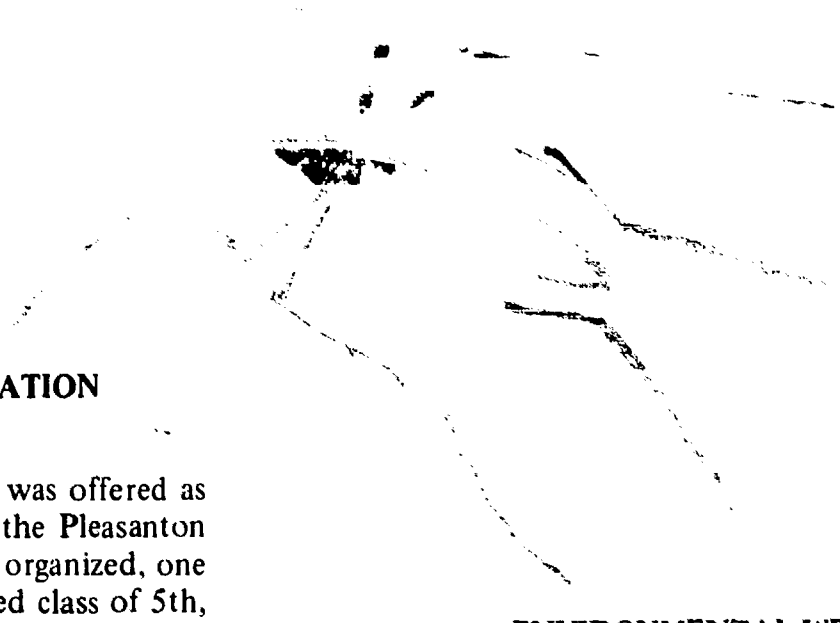
March 6	12:30-4:30 p.m.	"Pollution Problems of the Bay Area," Lawrence Hall of Science, Berkeley (first field trip)
March 14	9:00-12:00	Film, "Save the Bay," discussion groups
April 4	9:00-12:00	Guided bus tour of Bay Area, "Study of Polluted Areas," (second field trip)
April 11	9:00-12:00	In-depth study groups: garbage; water pollution; air pollution; population, housing, transportation.
April 18	9:00-12:00	Live play, "Man Nobody Saw," presented by Plays for Living
April 25	9:00-12:00	Guided bus trip to Alameda Beach (third field trip)
May 2	9:00-12:00	"How Are Pollution Problems Being Solved?" Visit to sewage plant, resource speakers, films, etc. (fourth field trip)
May 9	9:00-12:00	Cleanup of Industrial Park area
May 16	9:00-12:00	Films: "An Island in Time," "Glen Canyon, Place No One Knew," student evaluation
May 23	9:00-12:00	Workshop: Culmination activities and projects by students – art, poems, essays

Student Evaluations of the Mentally Gifted Minors Ecology Program:

"I liked this program, "California, Save It or Lose It," very much. I never knew this much about pollution. Before I started this program I didn't know the definition of pollution or ecology. Now I know. I don't think any improvements can be made that I can think of. I think it was very, very good."



Pleasanton Joint Elementary School District



SUMMER SCHOOL OUTDOOR EDUCATION PROGRAM

A four-week program in outdoor education was offered as part of the 1970 summer school program in the Pleasanton School District. Two groups of students were organized, one of 4th and 5th graders and a more experienced class of 5th, 6th and 7th graders. Most of the program included daily field excursions, overnight campouts and extended campouts.

The younger group made daily trips to Cull Canyon Park, Half Moon Bay, Del Valle Park, San Luis Dam, Coyote Hills Regional Park, and overnight campouts to Sunol Valley Regional Park and Big Basin State Park. The program culminated with a two-day and two-night campout at Columbia State Park.

The older students took daily trips to San Luis Dam, Cull Canyon Park, Del Valle Park, Coyote Hills Regional Park, and an overnight campout to Big Basin State Park. They also spent three days and two nights at Columbia State Park near Columbia-Calaveras. The program ended with an extended stay of four days and three nights at Wawona Campgrounds in Yosemite National Park.

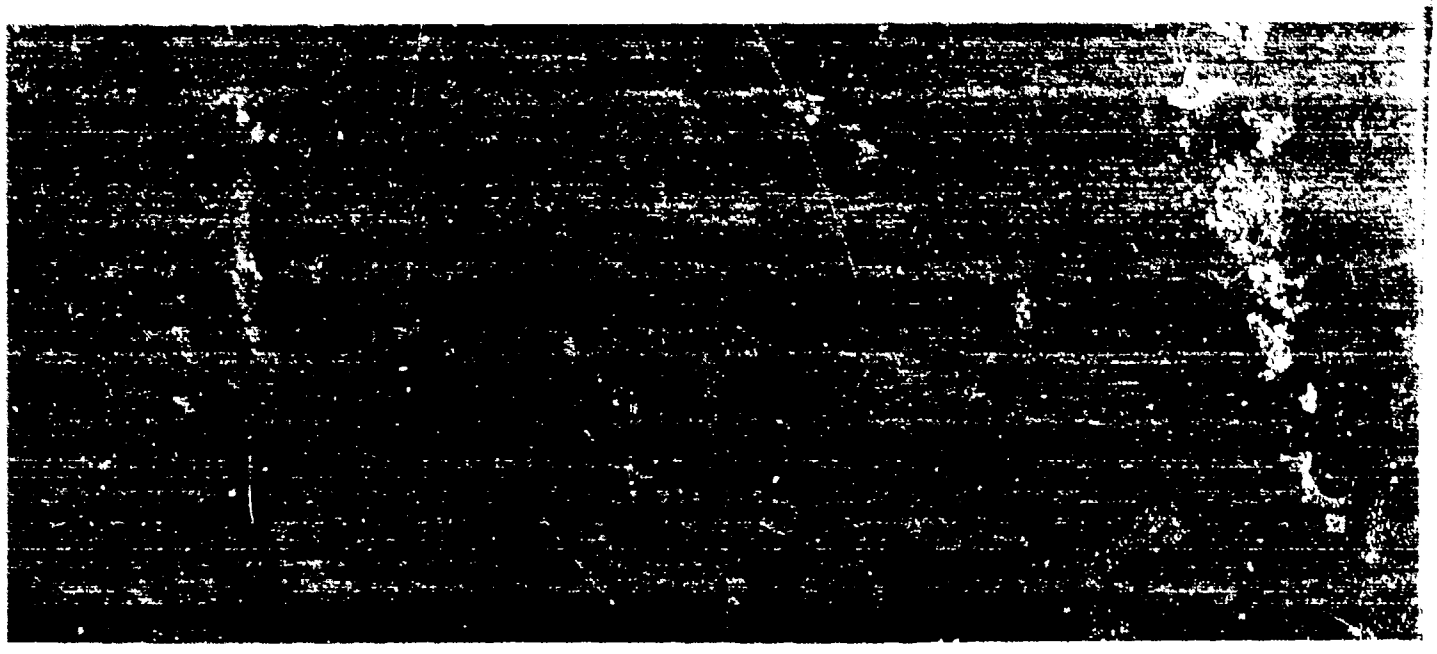
Jack Mann, former Alisal School principal, now superintendent of Sunol Glen School District, was in charge of the program.

ENVIRONMENTAL WEEK

Many high schools scheduled special environmental days or programs during the 1969-70 school year. This interest in pollution and other environmental problems often led to cleanup campaigns, pollution rallies, special speakers, displays and exhibits, or a one-day ban on driving motor vehicles to school. Many students also organized environment or ecology clubs.

Pacific High School in San Leandro scheduled an Environmental Week. The special week included conservation speakers, a "poverty lunch," a vehicle with an air pollution display, organized skits and movies, a cleanup litter walk, writing letters in support of environmental improvement, hall exhibits and a can collection drive.

Orle Jackson, former science department chairman at Pacific High School, now coordinator of drug education, was in charge of the arrangements.



David J. Russell, photo

Berkeley's Thousand Oaks School

ENVIRONMENTAL PROGRAM

During eight hours of the week, six classes of second and third graders at Thousand Oaks School, Berkeley, are involved in learning about their own environment. Children work in areas of their choice, moving freely from activity to activity not necessarily with their own teacher or with their own class group. The activities involve many areas of the curriculum—science, social science, language arts, art and music.

Large theme ideas are used—home and shelter, food, growth and reproduction. Each theme idea involves properties of living and non-living things, adaptation to the bio-physical environment, how man uses his environment and associated problems. Whenever possible activities take place somewhere out of doors on the school grounds. Many community resources are also used.

Undergraduate students in an environmental education course at the University of California, Berkeley, are being used as teacher-aids for individual and group activities. Marie Lowell is the program coordinator. Teachers of the six classes are Dorothy Annesser, Anne Campbell, Eugene Nakamura, Mary Pilley, Jane Walsh and Roger Morgan. Jack McFarland is the school's principal.

Albany's Cornell Elementary School

"POLLUTION iS MORE THAN A NINE-LETTER WORD"

(The following article was written by students from the sixth grade class of Robert Alpert, Cornell Elementary School, Albany Unified School District.)

This was the way we made our movie.

When we first decided we wanted to make a movie, we discussed what kind of movie we wanted. Did we want to make a movie on a book, a play, an anti-war movie or a pollution movie? The class voted on it. The pollution movie won the vote. Next we discussed why we wanted a pollution movie. There were many different reasons but one of the main ones was that practically every city in the United States has a pollution problem.

Now we had to get down to work and decide just what committees we needed. We decided on four committees - one for writing, "props," clothing and filming.

The writing committee consisted of seven people. They got their information from newspapers, magazines and other people in the class. They sat and discussed the positive and negative parts of the surroundings. The positive parts were the forests, parks and everything in nature that was pleasant. The negative parts were things unpleasant - smog, water pollution, trash, jet noise, congestion. We gave everyone on the writing committee a topic to write about. For example, San Francisco Bay was one of the topics. After each person finished his topic, the writing committee discussed it. They would accept, reject or change the idea. From these ideas the script was written.

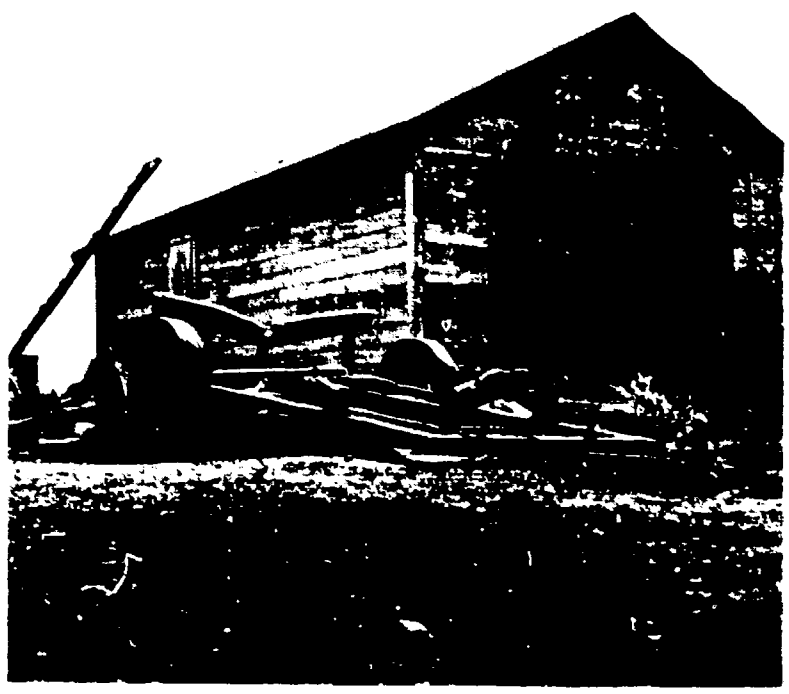
When this was done, we told the "props" committee what to make for the movie. The clothing committee decided what we should wear for each scene.

Next came the filming. We used Mr. Alpert's camera. All of our filming was done after school or during vacation except for one scene. The one scene was the funeral for Lake Erie. This we did as a class project. We were surprised when we finished filming to find it took over two months to film and edit our movie.

The sound track was next. Since we didn't have video tape, we used a tape recorder and synchronized sound with each scene. The entire class worked on this.

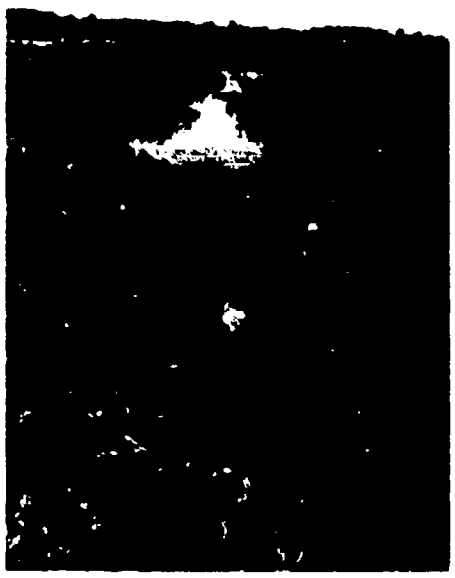
We titled our movie, "Pollution Is More than a Nine-Letter Word." We invited people to come and see it - parents, newsmen, congressmen and other community people who were interested. It was a fitting climax for our last week of school.

Where are the living things
---the large, the small, the microscopic?



Environmental conditions
provide ample scope
for varied plant and animal
life to develop. There are so many kinds. But man car
environment. How many unique plant and anima

ACTIVITIES IN THE OUTDOORS



alter and change the species will survive?

Criteria for Selection

The listings of school activities were compiled with the philosophy that environmental education should not add to an already overcrowded curriculum but should enrich learning and make it meaningful through the use of the outdoor environment. Activities were selected that can be carried out most effectively outdoors and that can contribute to the learner's understanding of his environment and his place in the use of its resources. This is not intended to be a limiting list but to be added to and modified by creative teachers.

Value

The value of environmental learning is in the impact of direct experience; that is, full personal involvement with one's environment. Facts are more quickly learned in association with a meaningful context, concepts are more clearly understood when developed through direct experience, and skills are best reinforced through application. Instead of studying *about* his environment, the learner is studying his environment. At the same time he is developing a sense of responsibility for it.

Arrangement

First, activities are grouped according to usual subject curriculum designations. However, as one fourth grade boy put it, "Having history, English, and science all at once saves a heap of time." Each suggestion is followed by columns showing curriculum correlations. For example, writing haiku poetry is considered an English activity, but the verse form relates to a social studies unit on Japanese culture. Illustrating it is an art experience, and the response to nature that inspires it could be part of a science unit on the five senses. Often it seems the content value of an activity is directly proportionate to the number of correlations available.

Second, activities are organized according to grade placement, but these are not discreet. For example, primary children can enjoy putting together a rhythm band of natural instruments, but older children can refine this idea into developing an orchestra with winds, strings and percussion.

Third, activities are organized according to the aspect of the environment with which the learner is involved — physical, biological or social. How an experience is handled changes the environmental aspect. For example, in a classification activity, children may arrange sets of seeds from the biological environment, or stones from the physical environment, or people for committees from the social environment.

Method

Finally, the learner is part of the environment that this publication is all about. All of the activities are proposed with the assumption that the child does the active learning. We do not do something to him, neither do we make him do something, but we open a gate to a curriculum path that is wide enough for teacher and pupil to explore together.

ON COLLECTING

As one plans outdoor activities a problem develops – that of collecting. There are no longer enough frogs and too many pockets for every boy to take one back. When the adult leading a field excursion picks one leaf to study, he is teaching, **"It is all right for me but not for you." Since the leaf loses its** character the minute it leaves the bush, it is much more instructive for each person to examine the leaf as he passes the growing plant.

In checking curriculum correlations, especially under art **and science, it is evident that the lowest learning value is** usually associated with projects that involve collecting. That is, beyond ordering and classification, collection has little use.

Art projects with natural material are high in creative potential. It is more truly creative to see a puppet head in a piece of driftwood and bring out those features than to carve a puppet out of a three-by-three block. When necessary to collect, the learning value can be expanded by teaching conservation practices in collecting. Dry wood, shells, pebbles, cones and seed pods are more useful than most growing things, but even these are not gathered where there are many people to enjoy them or where their removal noticeably changes the environment in which they are found. Anything alive has a right to be left in its place after study. A water strider in a jar is more real than a picture in a book, but not so real as a water strider in a stream. Thus an ethic of conservation can be learned by behavior based on understanding.

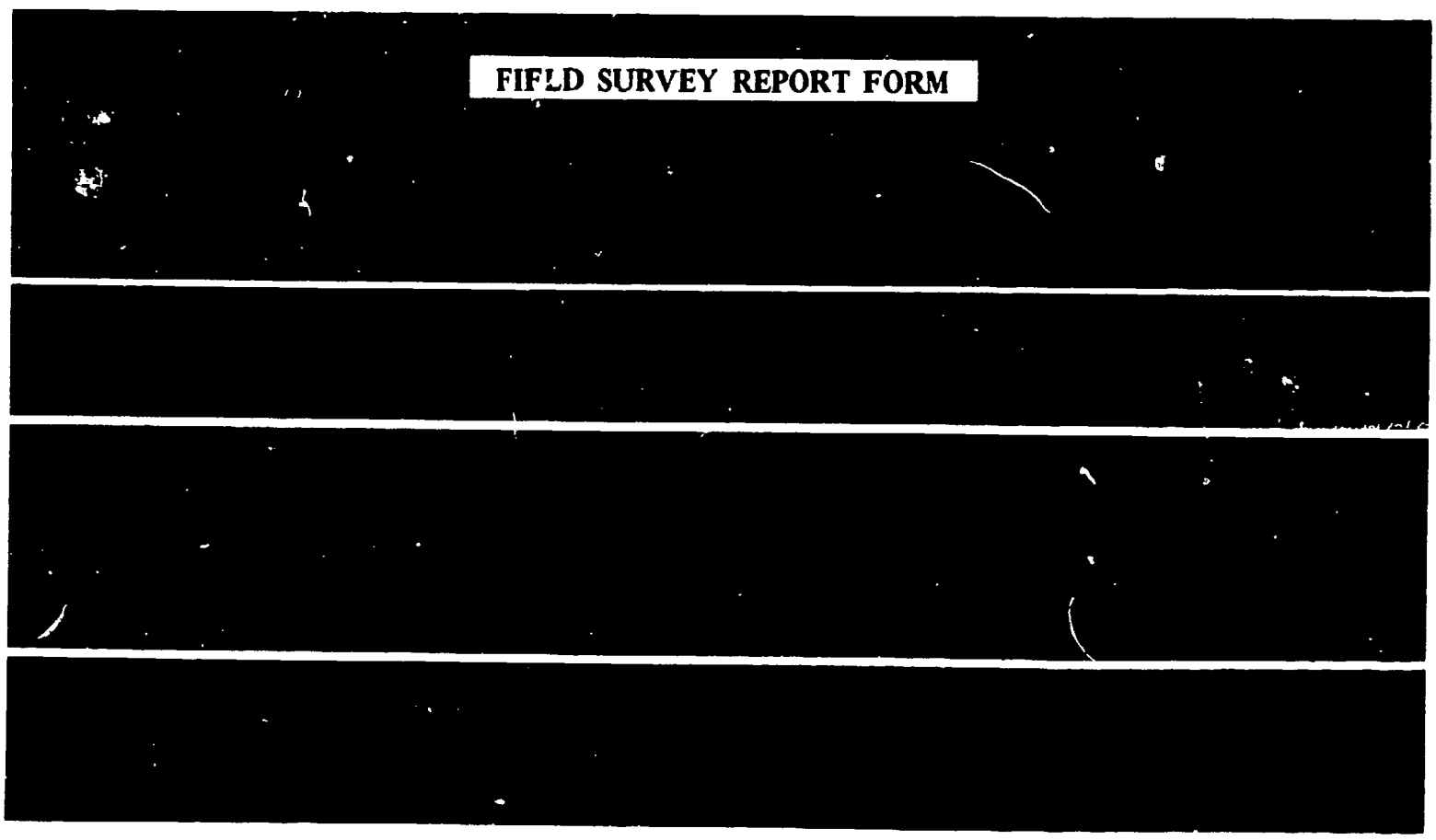
ENVIRONMENT

Environment is an everyday encounter. Teacher and class experience together.

- Where we are: map of school grounds – buildings, boundaries, size and shape.
- What's around me: individual journals of 20-minute trips to parts of the school grounds.
- Evaluations: what we like or dislike.
- Ideas created: how to change dislikes to likes.
- Communications: how and who to tell what we think.

PLANT DYES

Cherry roots	Blue-violet
Elderberries	Purple
Pokeweed berries	Reddish purple
Dandelion roots	Red-pink
Cherries	
Strawberries	
Red raspberries	
Sorrel roots and stalks	
Cardinal flower	
Red oak bark	
Hemlock bark	
Black raspberries	Purple
Grapes	Violet
Boiled blueberries	Blue
Walnut husks, boiled	Dark brown
Buckeye husks	Reddish brown
Goldenrod, boiled	Yellow dye
Agrimony leaves and stalks, boiled	
Osage orange roots and bark, boiled	
St. Johnswort flowers, boiled	
Willow leaves	Yellow
March marigold	
Ash inner bark	
Tulip tree leaves	
Ragweed	
Burdock	
Onion skins	
Birch bark	Rose tan
Willow bark	
Sassafras root	
Plantain leaves and roots, boiled	Green
Nettle roots, stalks, leaves	
Lily of the valley leaves	
Bloodroots, boiled	Yellow orange
Cherry bark	Salmon
Walnut husks and sumac leaves	Black



ART IN THE OUTDOORS

	Suggested Correlation to Other Curriculum Areas							Environmental Relationships		
	Physical and Mental Health	Language Arts	Mathematics	Music	Physical Education	Science	Social Science	Physical	Biological	Social
Activities for Grades K-12										
Make a color wheel using examples of colors found in nature.						●		●	●	
Investigate and compare arrangement, pattern, design, repetition in nature.			●					●	●	
Make texture rubbings using native materials.						●		●	●	
Mold native clay into creatures, pots, beads, plaques, stick in shells, "feelies," driftwood, tiles, brick. Fire them, if possible.	●	●				●	●	●		●
Use available surplus beach, forest, desert, natural materials to make collages.	●					●		●	●	
Make a sand sculpture.	●						●	●		
Do sand casting, make plaster plaques or candles.						●		●		
Make leaf prints, spatter, roller.						●	●	●	●	
Construct mobiles with surplus articles found on the ground.			●					●	●	●
Weave baskets and mats out of reeds and other materials.	●						●		●	●
Paint and/or assemble stones and sticks into shapes or artistic arrangements.								●		●
Activities for Grades K-3										
Make leaf crayon rubbings, spatter print leaves.						●			●	●
Fingerpaint to nature music.	●			●						●
Make sketches of clouds, different shapes, sizes, colors of clouds, trees, cones, grasses, leaves.			●				●	●	●	●
Make a turtle out of half a nut shell and paper, learn a song about a turtle.				●						●
Make twig or acorn puppets, dishes, animals.		●					●		●	●
Make a litter tree with collected litter.							●			●
Make little rabbits, ducks, etc., of rounded stones.										●
Make rock or seed mosaics.	●					●		●	●	●
Decorate rocks for use as paperweights.								●		

	Suggested Correlation to Other Curriculum Areas							Environmental Relationships		
	Physical and Mental Health	Language Arts	Mathematics	Music	Physical Education	Science	Social Science	Physical	Biological	Social
Activities for Grades 4-6										
Study the rhythms of fish in water, ripples in water, turkey vulture in air, etc.	●			●				●	●	●
Watch different concepts of color as the sun changes.						●		●		
Watch different concepts of texture as the sun changes.						●		●		
Consider perspective and size of plants and animals.			●					●	●	
Preserve a spider web by placing dark construction paper behind it, spray with clear fixative.						●		●	●	
Use leaves by sketching, waxing, or smoke print them.						●		●	●	
Make clay impressions of leaves, tracks, shells. Process and use native clays.	●					●	●	●	●	●
Collect and polish a limited number of stones.						●	●	●		●
Carve sandstone to make little rabbits, ducks, owls, etc.						●	●	●		●
Use sand for sculpture, sand painting, or to cast plaster and wax.	●						●	●		●
Carve driftwood sculpture.							●		●	●
Make name pins (different types), centerpieces, bark mosaics and neckerchief slides from wood.		●					●		●	●
Make flowers and animals from cross sections of cones.		●				●			●	●
Arrange herbaceous plants (not in a park).						●	●		●	●
Make dye from native plants (tie dying).							●		●	●
Make specimen board of flowers.						●			●	
Make jewelry from seeds, shells, twigs, galls, cones, etc.							●	●	●	●
Make mobiles, wind chimes, animals, table favors from things found in nature.				●		●			●	●
Pretend you are a small animal and draw surrounding area from its eyes.	●					●			●	
Draw and paint wildflowers.	●								●	
Paste natural object on paper, draw anything around it (fern may become fish fin).						●		●	●	
Make pen and ink drawings using oak gall ink.							●		●	●
Sketch sounds.	●			●				●		

	Suggested Correlation to Other Curriculum Areas							Environmental Relationships		
	Physical and Mental Health	Language Arts	Mathematics	Music	Physical Education	Science	Social Science	Physical	Biological	Social
Sketch specimens – insects.						●			●	
Draw any natural pattern seen through a 2-inch, cut out square to a larger scale.	●		●					●	●	
Pull threads from burlap and weave in leaves, twigs, needles, feathers; use yarn warp, weave in the same way.							●		●	●
Pick up litter and save what you can to be used to make bottle top necklaces and other pieces of art.							●	●		●
Make murals illustrating ecology.	●						●	●	●	●
Make art pieces by printing leaves, limbs, flowers using ozalid, silk screen, blueprint paper.	●					●		●	●	●
Mix paints from clays and berries and make paintings with them.							●	●	●	
Activities for Grades 7-12										
Photograph any outdoor scene.						●			●	●
Make lucite molds of outdoor specimens.									●	●
Study the rhythms of fish in water, ripples in water, turkey vulture in air, etc.	●			●				●	●	●
Watch different concepts of color as the sun changes.						●		●		
Watch different concepts of texture as the sun changes.						●		●		
Consider perspective and size of plants and animals.			●					●	●	
Preserve a spider web by placing dark construction paper behind it, spray with clear fixative.						●		●	●	
Make clay impressions of leaves, tracks, shells. Process and use native clays.	●					●	●	●	●	●
Use sand for sculpture, sand painting or to cast plaster and wax.	●						●	●		●
Carve driftwood sculpture.							●		●	●
Make name pins (different types), centerpieces, bark mosaics, and neckerchief slides from wood.		●					●		●	●
Make flowers and animals from cross sections of cones.		●				●			●	●
Arrange herbaceous plants (not in park).							●		●	●
Make dye from native plants (tie dying).							●		●	●

	Suggested Correlation to Other Curriculum Areas							Environmental Relationships		
	Physical and Mental Health	Language Arts	Mathematics	Music	Physical Education	Science	Social Science	Physical	Biological	Social
Make jewelry from seeds, shells, twigs, galls, cones, etc.							●	●	●	●
Make mobiles, wind chimes, animals, table favors from things found in nature.				●		●			●	●
Draw and paint wildflowers.	●								●	
Paste natural object on paper, draw anything around it (fern may become fish fin).						●		●	●	
Make pen and ink drawings using oak gall ink.							●		●	●
Sketch sounds.	●			●				●		
Sketch specimens- insects.						●			●	
Draw any natural pattern seen through a 2-inch, cut out square to a larger scale.	●		●					●	●	
Pull threads from burlap and weave in leaves, twigs, needles, feathers; use yarn warp weave in the same way.							●		●	●
Pick up litter and save what you can to be used to make bottle top necklaces and other pieces of art.							●	●		●
Make murals illustrating ecology.	●						●	●	●	●
Make art pieces by printing leaves, limbs, flowers using ozalid, silk screen, blueprint paper.	●							●	●	●
Mix paints from clays and berries and make paintings with them.							●	●	●	

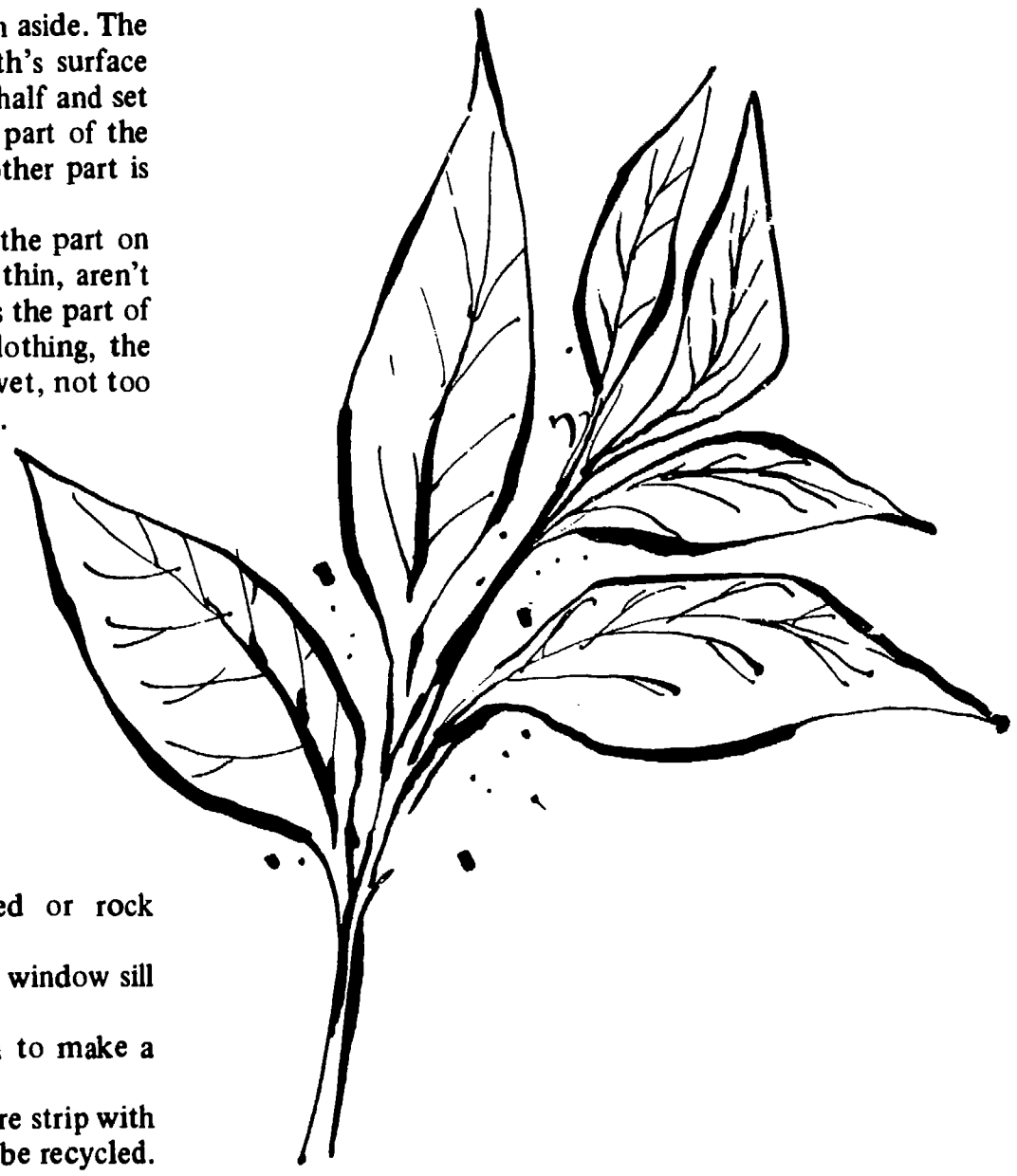
LANGUAGE ARTS IN THE OUTDOORS	Suggested Correlation to Other Curriculum Areas							Environmental Relationships		
	Art	Physical and Mental Health	Mathematics	Music	Physical Education	Science	Social Science	Physical	Biological	Social
Activities for Grades K-12										
Plan choral speaking of outdoor poetry. Use 5-senses hike and list words that describe.						●		●	●	
Give descriptions–looking for adjectives.								●	●	●
Give dramatization of daily life of a flower, a ranger's job, Indian in search of food and shelter.						●	●		●	●
Use shrubbery for stage curtains.							●		●	●
Listen to poetry inspired by the moment.		●		●						●
Listen for nature's sounds and weave them into a play.								●	●	●
Write in sand–feelings about day.		●						●		●
Write impressions of sight, mood, reaction to environment.		●								●
Write songs about the outdoors.				●						●
Tell stories: what a ranger does; you were the first one to ever be here; how I felt when I touched the slug; how a crab would feel when his rock is lifted; what it is like to be a mole; how the fossil got here; a day in Tilden, or a day in a park.						●	●	●	●	●
Encourage the spelling of new words learned in environment.						●				●
Write poetry: haiku (an unrhymed Japanese poem of three lines) or cinquain (a five-line stanza) are especially suitable. Sketch illustration for it.	●					●			●	●
Activities for Grades K-3										
Feel in a feel box, describe what is in it without looking or naming it.						●			●	●
Tell: "Guess me" (tell about where you saw a creature, describe it; "Guess who I am," use initial consonant; charades–act out a tree and other stunts; imitate sounds; dramatize an animal in the park).				●		●		●	●	●
Do pantomime game with describing words.		●				●			●	●
Listen: puppet plays with native material; recognize familiar sounds (bluejay, airplane).	●			●		●			●	●
Encourage conversation about the outdoor activities.							●			●
Develop outdoor vocabulary–resource, rodent, root.						●		●	●	●
Relate outdoor experiences in sequence.						●	●	●	●	●

	Suggested Correlation to Other Curriculum Areas							Environmental Relationships		
	Art	Physical and Mental Health	Mathematics	Music	Physical Education	Science	Social Science	Physical	Biological	Social
Group objects–stones, nuts.			●			●		●	●	●
Note likenesses and differences–leaves.						●		●	●	
Explain how something happens–a bird gets an insect.						●			●	
Establish purposes for reading–to find out, to get directions, to enjoy; *Pagoo*, after beach trip.						●			●	●
Follow directions–how to go down a steep hill.						●		●		●
List signs of the season–sights and sounds.		●				●		●	●	
Write chart stories about exciting group experiences outdoors.							●	●	●	●
Write beginning consonant sounds in sand (auditory and kinesthetic learning).								●	●	●
Write thank-you letters to group leaders.							●			●
Activities for Grades 4-6										
Talk: each child is a sense–interpret for class.						●		●	●	●
Play: Twenty Questions.						●	●	●	●	●
Give reports about beach area.						●	●	●		●
Listen to orientation, goals, expectations for field experience.						●	●			●
Evaluate field trips.						●				●
Research an area, plants and animals, uses of resources.						●	●	●	●	●
Read charts–tide tables, population density.						●	●			●
Do critical reading of persuasive material–conservation literature.							●			●
Compare news media–report with eyewitness understanding.										●
Describe outing experiences, sequences observed.						●				●
Make generalizations based on experience, listening and reading.						●				●
Make inferences.							●			●
Make 5-volume dictionary of the five senses with cross references.						●				●
Send conservation letters to rangers, congressmen.							●			●
Describe tree in small group; cross off every word used by another group (vocabulary).						●			●	●

Hunt things
Use eyes, ears, nose, fingers
Hunt happenings
When it's windy, sunny, rainy
Hunt questions
What makes it different
Find plants
Where and why
Find animals
Where, why and why not
Find food chains
Who depends on what
Measure differences
In air, space, light, soil

Cut an apple into quarters and set three of them aside. The remaining quarter represents the part of the earth's surface that is not under water. Next, cut this quarter in half and set one piece aside. The piece in hand represents the part of the earth that is suitable for human habitation. The other part is too cold, too dry or too mountainous.

Now cut the last one-eighth which represents the part on which man can live into four equal slices. Rather thin, aren't they? Just one of these four small slices represents the part of the earth that supplies most of our food and clothing, the small part which is presently tilled. It is not too wet, not too poor, not occupied by cities, factories or highways.



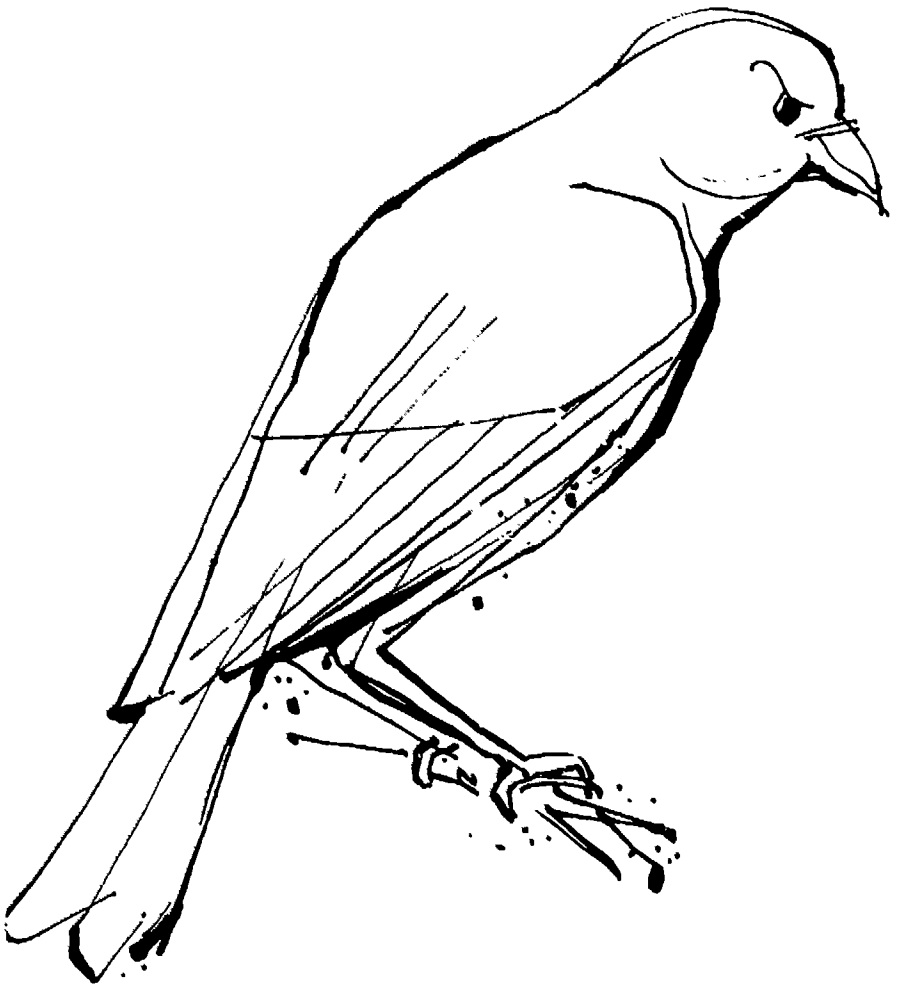
RECYCLE

Use old muffin tins and egg cartons for seed or rock collections.
Use coffee cans or half of plastic bleach bottles for window sill garden.
Cut a lid in the side of a 2-quart milk carton to make a vasculum.
Hang samples of school yard litter on a chicken wire strip with tape or clothespins. Remove the ones that can be recycled.

Follow a ladybug or a bee while you count slowly to 25.
Did it move?
How many times did it stop?
What did it land on?

Measure the distance from the school door to the first animal or plant discovered.

	Suggested Correlation to Other Curriculum Areas							Environmental Relationships		
	Art	Physical and Mental Health	Mathematics	Music	Physical Education	Science	Social Science	Physical	Biological	Social
Keep log of trip or activity.							●	●	●	●
Make a treasure map.							●	●	●	●
Write conclusion to a story: life in a vulture's nest, after observing pair in courtship flight.						●			●	
Activities for Grades 7-12										
Speak, explain, report on any environmental topic.						●	●			●
Persuade industrialists and legal representatives to change their opinions.							●			●
Listen, hear dialects of people contacted on field trips.						●	●			●
Hear issues with an open mind.							●			●
Evaluate study of reading a dichotomous key for identification.						●		●	●	●
Read news reports, conservation bulletins.							●			●
Scan congressional reports.							●			●
Appreciate great outdoor writers--John Muir, Aldo Leopold.		●				●	●			●
Judge reliability of material.							●			●
Write reports on community studies, biological investigations.						●	●		●	●
Take notes.						●	●			●
Organize material from many sources.							●			●
Locate material in libraries, including technical libraries.						●	●			●
Compare news media reporting with eyewitness understanding.										●
Do creative reading based on rich experience.										●
Describe outing experiences, sequences observed.						●				●
Make generalizations based on experience, listening and reading.						●				●
Make inferences.							●			●
Send conservation letters to congressmen, other public officials.							●			●
Write letters to conservation groups to find out what is being done.							●			●
Keep a log of trip or activity.							●	●	●	●
Write conclusion to a story.						●			●	



NATURE BACK PACK

A nature back pack can be used to investigate many outdoor areas. It can also be used as a resource to teach lessons on outdoor tools and instruments.

Introduce each item by showing it. Name it if the students cannot. Do not tell how it is used. Give two or more students each one item to investigate, finding out how to use it or what value it is to them. Allow sufficient time for exploration. Later, have each group describe their item, tell its purpose or value and, if possible, demonstrate how it is used. Other class members might also enlarge on ideas for usage.

Spotting scopes
Signaling mirrors
Magnifying glass
Geology scratching pins
Geology hammer
Fixed focus magnifier
Audubon bird call
Duck call
Predator call
Two plastic rulers (6" and 12")
Cloth measuring tape
Hand-size tree key booklet
Beaufort wind scale folding chart
Cloud code chart
Field identification manual for birds, insects, rocks (according to season)
Soil auger
Trowel
Matches
Thermometers
Release vials
Insect aspirator
Collapsible net
Wiggle bag
Compass and scale divider
Nature's Treasure Map

Nature back pack list prepared by Joshua Barkin, Supervising Naturalist, Tilden Park, East Bay Regional Park District

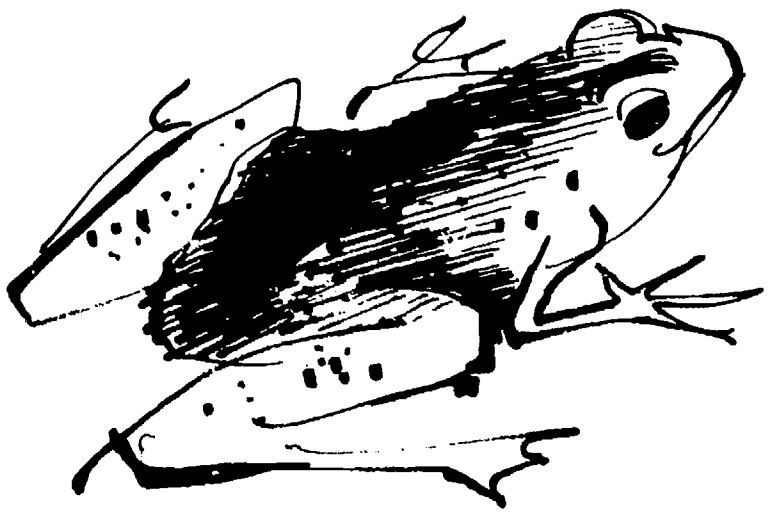
MATHEMATICS IN THE OUTDOORS	Suggested Correlation to Other Curriculum Areas							Environmental Relationships		
	Art	Physical and Mental Health	Language Arts	Music	Physical Education	Science	Social Science	Physical	Biological	Social
Activities for Grades K-12										
Count points o[illegible] to identify trees.						●			●	
Make a sun dial (for primary clock unit, sixth grade study of Aztecs).						●	●	●	●	●
Tell temperature.						●		●		●
Measure rainfall, humidity, wind speed.						●		●		●
Earn and save money for the cost of a trip.							●			●
Define problem to be solved.			●				●			●
Use more than one way to solve a problem.			●							●
Tally–cricket chirps, etc.						●			●	●
Activities for Grades K-3										
Discover number of star points on eucalyptus seed pods.	●					●			●	●
Find counters in nature–acorns, pods.						●			●	
Pick up three leaves, five stones, arrange in size order.						●		●	●	
Divide people into groups for activities.							●		●	●
Measure how far a beachhopper hops.						●		●	●	
Recognize shapes–rectangular, round, etc.	●							●		
Develop a concept of many, few, greater than, less than.			●					●	●	●
Develop concepts of larger and smaller.			●					●	●	●
Develop concept of finite numbers, infinite numbers.			●					●		
Use levers, pulleys, e.g., to move a rock.						●		●		●
Develop concepts of sets using objects in nature.						●		●		●

	Suggested Correlation to Other Curriculum Areas							Environmental Relationships		
	Art	Physical and Mental Health	Language Arts	Music	Physical Education	Science	Social Science	Physical	Biological	Social
Activities for Grades 4-6										
Find examples of Fibonacci number series, proportion - pine cone spirals.	●					●			●	●
Study population of sandhoppers on a beach.						●	●		●	●
Use older children to teach primary children to pace 50 feet.							●	●		●
Graph number of samples in a plot study.						●	●		●	
Use plumb line and level to measure slope of hill.							●	●		
Find the number of board feet in a tree.						●	●		●	
Find the heigh' of a tree by arm and stick sight.						●			●	
Find the height of a tree by hypsometer.						●			●	
Find the height of a tree by clinometer.						●			●	
Find the height of a tree using shadow stick.						●			●	
Find the circumference of trees.						●			●	
Find the perimeter of area of ground. With 1-yard strings show whether it is same in different shapes (square, circle, triangle, etc.). Does area change?							●	●		
Follow a compass course, read a compass.							●	●		
Find flow of water in a stream.						●		●		
Measure tide increase—compare to tide table. Use averaging.						●		●		
Determine volume and weight of wet and dry clay, sand.						●	●	●		
Survey.				●			●	●		
Study timing, with gravity, throw ball to top of tree, count time to drop.					●	●	●	●		●
Determine how long is a minute. Sit down when you think it is finished.							●	●		●
Develop concept of acre by pacing it out.					●		●	●		●
Use ratio and proportion for equivalent triangles.	●						●	●		
Develop concept to measure distance across brook, units of measure—tons of rock, second foot flow of water, weight of water, and power generation.						●	●	●		
Estimate ship's speed.							●	●		

	Suggested Correlation to Other Curriculum Areas							Environmental Relationships		
	Art	Physical and Mental Health	Language Arts	Music	Physical Education	Science	Social Science	Physical	Biological	Social
Understand laying out scale model of solar system.						●		●		
Play "Kalah" game (ancient mathematics game).							●	●		●
Use statistics and probability–graph measurements of leaf shapes.						●			●	
Carry out a treasure hunt. paces, degrees.					●		●	●	●	●
Activities for Grades 7-12										
Extend concepts of Fibonacci series.	●					●			●	●
Use abacus and ancient counting forms.							●			●
Find perimeters and volumes of irregular shapes–water in reservoir, distance around reservoir.						●	●	●		
Find height of hill, trees, etc.						●		●		
Understand economics of conservation–cost of pollution control, taxable income of developed land.							●			●
Use negative numbers in weather station –reading wet-dry thermometer.						●		●		
Graph natural history data.						●		●	●	
Graph weather information.						●		●		
Involve treatment of data (statistics).							●			●
Use per cent to show change in nature.						●		●	●	
Do probability and weather (per cent of change).						●		●		
Use tree rings to study mathematical laws–weather cycles, sun spot activity, etc.						●		●	●	
Study rate of radioactive decay of certain elements to estimate time periods.						●	●	●		●
Use stratification of rock and study of fossils to determine age.	●					●	●	●	●	●
Examples in nature of variables which change at a rate proportional at any instant to the amount of the variable present at that instant. Known as the "law of organic growth." (Examples: variation of atmospheric pressure with altitude above sea level, the disintegration of radioactive substances, etc.)						●		●	●	●
Probability relating to chromosonal makeup of a new organism (animal or plant).						●			●	

MUSIC IN THE OUTDOORS	Suggested Correlation to Other Curriculum Areas							Environmental Relationships		
	Art	Physical and Mental Health	Language Arts	Mathematics	Physical Education	Science	Social Science	Physical	Biological	Social
Activities for Grades K-12										
Sing songs about the outdoors. Let children select their songs.						●				●
Hum your feelings as you walk.		●			●			●	●	●
Write songs about what you see.	●		●			●		●	●	
Write new verses for familiar songs.			●							●
Set original poems to music.			●							●
Make a rhythm band find instruments: leaves, sticks, bones, shells, grass, stones. Group by type –wind, percussion, string (no brass). Play a song.				●		●		●	●	●
Activities for Grades K-3										
Listen to sounds of nature, rhythms compare these to mechanical sounds.				●				●	●	●
Imitate sounds match tones, rhythm, melody line of bird calls.						●			●	
Interpretive dance using music depicting movement in nature – leaves, limbs, ducks, snakes, butterflies, seaweed in surf.		●			●	●		●	●	
Compare sounds and motion in nature to musical instruments in symphony and/or popular orchestra and bands.						●		●	●	●
Find origin of Indian dances in sounds and motion of birds and animals.						●	●		●	●
Imitate duck calls, [illegible] calls.						●			●	
Activities for Grades 4-6										
Carry a pitch pipe and try to key sound in nature.						●		●	●	
Make reed flute.				●					●	
Make wooden whistle.		●							●	
Do folk dances to the music of different countries.					●		●			●
Play tonettes outdoors–use to interpret rhythms.				●				●	●	●
Set original outdoor poetry to music.			●							●
Sing outdoor songs of other peoples–"Happy Wanderer."							●			●
Enjoy group singing. Action songs–"This Old Man" and rounds.		●								●
Notate music themes for patterns in nature–wind, water, plant movement, bird calls, animal movement.						●		●	●	●

	Suggested Correlation to Other Curriculum Areas							Environmental Relationships		
	Art	Physical and Mental Health	Language Arts	Mathematics	Physical Education	Science	Social Science	Physical	Biological	Social
Activities for Grades 7-12										
Participate in song fests with guitars, ukuleles, mouth harps.							●			●
Harmonize.							●			●
Enjoy modern folk music—"Show a Little Kindness."			●				●			●
Do interpretive dances.		●			●		●			●
Understand how nature inspired composers.		●				●		●	●	
Recognize nature themes in classical music.						●		●	●	
Organize and lead songs and games around evening campfire.							●			●
Consider the rhythms of the movement of fish, ripples on the water, birds in flight.				●		●		●	●	



ENDANGERED SPECIES

Birds (36)

Akiapolaau
Aleutian Canada Goose
American Ivory-Billed Woodpecker
Attwater's Greater Prairie Chicken
Bachman's Warbler
California Condor
Cape Sable Sparrow
Crested Honeycreeper (Akohekohe)
Dusky Seaside Sparrow
Eskimo Curlew
Florida Everglade Kite
Hawaiian Common Gallinule
Hawaiian Crow (Alala)
Hawaiian Dark-Rumped Petrel
Hawaiian Duck (Koloa)
Hawaiian Goose (Nene)
Hawaiian Hawk
Kauai Akialoa
Kauai Nukupuu
Kauai Oo (Oo Aa)
Kirtland's Warbler
Laysan Duck
Laysan Finchbill (Laysan Finch)
Masked Bobwhite
Maui Parrotbill
Mexican Duck
Nichoa Finchbill (Nihoa Finch)
Nihoa Millerbird
Ou
Palila
Puerto Rican Parrot
Small Kauai Thrush (Puaiohi)
Southern Bald Eagle
Tule White-Fronted Goose
Whooping Crane
Yuma Clapper Rail

Fishes (22)

Arizona (Apache) Trout
Big Bend Gambusia
Blue Pike
Clear Creek Gambusia
Comanche Springs Pupfish
Colorado Squawfish
Cui-ui
Desert Dace
Devils Hole Pupfish
Gila Topminnow
Gila Trout
Greenback Cutthroat Trout
Humpback Chub
Little Colorado Spinedace
Longjaw Cisco
Maryland Darter
Moapa Dace
Montana Westslope Cutthroat Trout
Owens River Pupfish
Pahrump Killifish
Piute Cutthroat Trout
Shortnose Sturgeon

Mammals (14)

Black-Footed Ferret
Caribbean Monk Seal
Columbian White-Tailed Deer
Delmarva Peninsula Fox Squirrel
Florida Manatee or Sea Cow
Florida Panther
Grizzly Bear
Guadalupe Fur Seal
Indiana Bat
Key Deer
Red Wolf
San Joaquin Kit Fox
Sonoran Pronghorn
Timber Wolf

Reptiles and Amphibians (6)

American Alligator
Black Toad, Inyo Country Toad
Blunt-Nosed Leopard Lizard
San Francisco Garter Snake
Santa Cruz Long-Toed Salamander
Texas Blind Salamander

PHYSICAL AND MENTAL HEALTH IN THE OUTDOORS	Suggested Correlation to Other Curriculum Areas							Environmental Relationships		
	Art	Language Arts	Mathematics	Music	Physical Education	Science	Social Science	Physical	Biological	Social
Activities for Grades K-12										
Dress suitably for activity.							●		●	●
Appreciate contrast of natural environment to urban environment.		●					●	●	●	●
Release social pressures–being on someone else's schedule.							●	●	●	●
Reflect quietly, enjoy nature.	●	●		●			●	●	●	●
Enjoy relaxed atmosphere–no bells, less noise.		●					●		●	●
Learn survival techniques.						●	●	●	●	●
Struggle for survival–healthy organism survives.					●	●	●		●	●
Investigate dependence on natural resources for our life–concept developed through observation, dramatize food chain.		●				●	●	●	●	●
Collect litter–how does litter affect the way you feel? Clean-up contests.	●					●	●	●		●
Observe Bay vista re air pollution.	●						●	●	●	●
Recognize harmful plants and animals–poison oak, hemlock, rattlesnakes.						●	●		●	●
Live together outdoors.						●	●	●	●	●
Share good experiences together.		●					●		●	●
Overcome fears of outdoors--seeing and handling snakes, spiders.		●					●		●	●
Activities for Grades K-3										
Understand diet -varied and specific for species.						●	●		●	●
Recognize poison oak.						●			●	
Learn first aid for cuts, abrasions.						●			●	●
Stay with group.		●					●			●

	Suggested Correlation to Other Curriculum Areas							Environmental Relationships		
	Art	Language Arts	Mathematics	Music	Physical Education	Science	Social Science	Physical	Biological	Social
Activities for Grades 4-6										
Learn trail safety walking on hills, uneven ground.					●		●	●	●	●
Learn what to do if lost.							●	●	●	●
Use mud to relieve insect stings.						●		●	●	
Use spider webs to stop bleeding.						●			●	
Learn how to use first aid kit on trail.							●		●	●
Know what diseases are transmitted by certain animals.						●	●		●	
Investigate causes and controls of air and water pollution. Compare water, samples.						●	●	●	●	●
Prepare natural foods for eating—acorn, honeysuckle, thistle, buckeye, cattails, berries. Plant identification—poisonous vs. edible.						●	●		●	●
Develop open-mindedness. Do not prejudge.							●			●
Use freedom of outdoors to develop healthy attitudes.						●	●			●
Activities for Grades 7-12										
Measure breath rate before and after hike, climbing hill; measure pulse.			●		●			●	●	●
Plan menus for an extended field trip.							●		●	●
Get sleep and rest on an extended field trip.							●		●	●
Develop satisfying relationships with others.							●		●	●
Observe and follow the rules.							●	●	●	●
Accept responsibility.							●			●
Develop open-mindedness. Do not prejudge.							●			●
Use freedom of outdoors to develop healthy attitudes.						●	●			●
Learn and teach trail safety.					●		●	●	●	●
Learn how to use first aid kit on field excursion.							●		●	●
Plan a menu using natural foods. Check poisonous vs. edible.						●	●		●	●
Investigate causes and solutions to different kinds of environmental problems.						●	●	●	●	●

NATURE GAMES AND EXPLORATIONS

Color Hike

Make a large color wheel. Browns, tans and greys should be included. Go on a hike and bring back nature's "discards" of all colors. Match objects to sections of the color wheel. A variation on this theme would be to assign a color to one or two members of the group. If they would find it too difficult to hold the color in mind, give them a small color chip to carry with them. Their focus during the exploration would be on their particular color.

Staking Claims

Two to three in a team. Use six feet of string. Tie ends together, place on ground and hold in place with rocks. Appoint a secretary for each group, and have a report made on all things (animal, vegetable, mineral and other) found in, on and above your claim. Make up descriptive names for unknowns. Total the numbers and compare with other teams. Don't forget to replace any rocks you look under.

Scavenger Hunt

The ideal team size is four to six. Each group is given identical lists of natural things which can be found in the area. Set a time limit. The team with the most nearly complete list wins. Suit your hunt to the group's abilities. Stress conservation practices. In addition to specific kinds of plants, rocks or little animals, include in your list some general categories such as "a compound leaf," "a toothed leaf," "pebble or rock showing the effects of erosion," "two different shapes of leaves from the same tree," "leaf with vein parallel to margin," "eucalyptus nuts with 3, 4 and 5 pointed star pattern," "three different kinds of seed containers."

Treasure Hunt

Eight or less to a team. A set of clues for each team. The clues are hidden in or very near to places that would exhibit some aspect of nature and consist of descriptions of these places, e.g., "I'm tall, evergreen, and when I drop my leaves, they're still attached to a twig" (redwood); or, "I'm always growing out of my bark, which is splitting and peeling constantly" (eucalyptus); "My roots are so big that the Indians called me 'man-in-the-ground' " (wild cucumber); "I was an important source of food to the Indians" (oak tree); "Look for the door to my house. I'm small, furry, and I can do a pretty good imitation of a bulldozer" (gopher); "Ages ago I made a sudden trip out of the depths of the earth" (volcanic rock).

Matching Leaves

Keeping in mind good conservation practices, collect a variety of leaves from a given area. Include two or three of each kind. Each player draws a leaf and goes forth to find the tree or shrub it matches. He collects one matching leaf and returns to the starting point with his two leaves. It may or may not be advisable to make this a race, depending upon the abilities of the group. A variation would be to find a seed container from the tree or shrub that your leaf matches.

Snatch and Skeedaddle!

Two teams from three to twelve players line up facing one another fifteen feet from a center line. Teams count off in opposite directions left to right, right to left. On center line place several natural objects (preferably ones which can be found in your locality) such as rocks, seeds, flowers, leaves, twigs, bark, cones, etc. These are named and pointed out to all. Leader then calls off name of one object and a number. Players having that number race to center. The first one to reach it, grabs it and tries to return to his line without being tagged by his opposite number. If successful, his team scores two points. If tagged by his opponent, one point is scored. Object is returned to center line. New objects may be introduced as game progresses.

Tag It!

Divide the group into two teams (not more than eight to a team). Team A is given five numbered tags and sent off to a given area to tag five places which exhibit some event or form of nature. One team member records the number and reason why the tag was placed in its particular location. Meanwhile Team B is doing the same thing in a different area. At the end of a given period of time (10 to 15 minutes), both teams return to the starting point. Team A then proceeds to Team B's area and tries to guess the reasons why Team B put their tags where they did. Meanwhile, Team B is checking over Team A's tags. Both record their answers, and return to the starting point and compare notes. In addition to tagging types of plants or trees or signs of animals, a group might indicate such things as soil-building material, erosion, a spot where man has interfered with nature's plans, a spot where nature has healed her own wounds, etc.

Feel It!

You will need a place such as a "feel box" or a paper bag in which you can conceal a natural object. You will also need a place such as a blackboard or a pad of newprint on which to record certain observations for everyone to see. The group is divided into teams which are sent out to find a natural object (no live animals, please!) to be concealed in the box. They do not let the other team see what they have chosen. First team to be detectives chooses a "feeler" and a recorder. The "feeler" is instructed to feel the concealed object and describe it. He is not to tell what it is even if he knows. He describes its size, weight, shape, texture, etc., until the recorder has a good list of adjectives – such as egg-shaped, light weight, dry, prickly, not solid, etc. A third volunteer is chosen to try to draw a picture of what these adjectives might describe. The object is then revealed and everyone can judge how good the description was. The process is repeated with the opposing team being the detectives.

Pocket Nature Trail

Use file cards. Punch one hole so that they may be held together by a one-inch notebook ring. Explore an area such as a backyard, vacant lot, schoolyard or city park, making note of different kinds of conspicuous plants, shrubs or trees which you can use as "trail-markers." Draw a "trail map" on one card. Make crayon prints on ordinary typewriter paper of typical leaves of the "marker plants." Cut out prints and mount on cards. Number each card and note where they may be found on the map. On the back of the cards give the name and observations (use your five senses) about it. Plan to make successive trips to the same area. Leave room on the cards for observations of events or changes that may occur in the area around the marker, e.g., "Look for ant highways along the trunk of the tree," or "Look for spider webs," or "A small ½-inch hole in the ground three feet west," or "Chewed leaves overhead." Let groups exchange nature areas and see what they can add to them.

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PHYSICAL EDUCATION IN THE OUTDOORS	Suggested Correlation to Other Curriculum Areas							Environmental Relationships		
	Art	Physical and Mental Health	Language Arts	Mathematics	Music	Science	Social Science	Physical	Biological	Social
Activities for Grades K-12										
Do developmental exercises.		●					●			●
Do rhythms–dances and instruments.		●			●					●
Jump rope.		●					●			●
Run and jog.		●					●	●		●
Do stunts and tumbling.		●					●			●
Have an A-Z scavenger hunt for fallen or non-living objects.			●			●	●	●	●	●
Do aquatic activities–swimming, water safety.		●					●	●		●
Activities for Grades K-3										
Run, dodge and stop.		●					●	●		●
Bend and stretch.		●					●	●		●
Climb and hang.		●					●		●	●
Throw objects in a field or outdoor area.		●					●	●		●
Take a walking trip.		●				●	●	●	●	●
Play tag games wood tag.		●				●	●	●	●	●
Play "Hide and Seek."		●					●	●	●	●
Play "Fox and Geese on the Beach."						●	●	●		●
Play "Kick the Can."							●			●

	Suggested Correlation to Other Curriculum Areas							Environmental Relationships		
	Art	Physical and Mental Health	Language Arts	Mathematics	Music	Science	Social Science	Physical	Biological	Social
Activities for Grades 4-6										
Play rattlesnake game—"Capture the Flag," "Stalk the Deer," "Indian Bird Hunt," "Pat and Mike."						●	●	●	●	●
Do folk dancing, other hiding, stalking, and campfire games.					●		●		●	●
Follow natural obstacle course with or without relays.		●							●	●
Learn to fly cast (fishing).		●						●	●	●
Have a treasure hunt—with compass course.			●	●			●	●	●	●
Play "I Go West" (compass game). Each person in circle has direction—220, 90, 45 degrees, etc. Play like tag ball.				●			●	●		●
Build a human pyramid.				●					●	●
Play "Kick the Can."							●			●
Activities for Grades 7-12										
Do folk dancing.		●			●		●			●
Play horseshoes.		●					●	●		●
Practice field archery.		●					●		●	●
Ride bicycles on field trips.		●				●	●	●	●	●
Hike for extended periods.		●				●		●	●	●
Do aquatic activities—swimming, diving, synchronized swimming, water polo.		●					●	●		●
Learn and practice fly casting.		●					●	●		●
Do social and family recreation—table tennis, deck tennis, shuffleboard, croquet.		●					●	●		●
Play team games—volleyball.		●					●			●
Do combatives—wrestling, boxing, judo.		●					●			●
Develop physique by weight training.		●								●

THE 100-INCH HIKE

This outline will contain the framework of the trip, plus some dialog, in order to give the feeling of the hike. The use of the "Socratean" type dialog between the leader and the children gives impetus to their desire to learn and to see.

The Grass Jungle

• Has anybody here ever visited a jungle? You haven't? Well, then let's get down on our hands and knees and let's crawl through the grass jungle. How come the grass jungle is so wet below and so dry on top? It's because the plants and grasses are like umbrellas. Your umbrella keeps the rain off; these umbrellas keep the rain in. Let's feel around and see how damp the jungle is. All jungles are damp – kept moist by the plant umbrellas.

• Here is some clover – that means we are lucky! We are "in clover." Oh, look, here is some red clover. Here is a yellow burr clover. Why don't we take the burr and put it on your jacket – maybe it will travel with us the rest of the way!

• Here is another traveler, only this one flies! Does anyone know what it is? That's right – it's a dandelion. This one is a "ripe" dandelion, ready to fly away. The seed is the weight, and the other part is the parachute. Anyone want to plant a dandelion? Okay, gang, BLOW!

• Look, Joe just found a "skeleton"! A skeleton leaf. The outside of it is gone, and the inside is left (the veining). So we can see how a leaf is put together. That is what all skeletons teach us, how things are put together. Marcia has a skeleton. It's part of a beetle. We are sure glad she found it. This shows us beetles walk inside out. Their skeletons are on the outside. Our skeletons are on the inside.

• Beetles are great "sniffers" – they have a good sense of smell. That's how they find dead animals and rotting plants to feed on. Why don't we be good "sniffers" too?

• Here is a mighty hunter of the jungle – a spider. Does anybody know what kind of spider he is? If he is found in the grass, what's his name? That's right, he's called a Grass Spider! What a smart group of kids!

• Who likes dinosaurs? Here's a sow bug and a pill bug. They were on earth millions of years before the dinosaurs. The sow bug is very flat so he can protect himself by hiding under rocks and wood. A pill bug protects himself by rolling up like an armadillo – that's why his long, fancy scientific name is "Armadillum." You know, they are not insects. That's right – because they have more than six legs. They belong to the same family as the crab and lobster in the sea – they are crustaceans. Sow bugs and pill bugs help make soil. They chew up dead plant material.

• Here is the "old man of the jungle" – the ant. He lives the longest of any insect. He uses his feelers for many things – to find out what family of ants he belongs to; to take care of the ant eggs; for smelling. By smelling his own feet, he knows if he is on the right trail, and this helps him to get back home.

• Do you take a nap? I would like to take a nap too, but I can't because the people who work in your parks are very busy, and my boss wouldn't like it if I took a nap on the job. Oh, well, why don't we all take a 5-second nap togehter? I think my boss will understand, and we will use the warm sun as our blanket. Isn't the sun a warm cozy blanket? Are you nice and warm? Is everybody comfortable? (Everybody pretends to snore.)

• There goes a dragonfly and a butterfly. It's time to wake up. Whose wings are bigger, the butterfly's or the dragonfly's? That's right, the butterfly's. That butterfly is called a Swallowtail. But the insects with the biggest wings are not necessarily the fastest flyers. Look how fast the dragonfly goes through the air! The butterfly tastes his food through his feet and legs – and the dragonfly can see upwards, backwards and all the way around. The butterfly drinks his food, but the dragonfly eats lots of mosquitoes.

• Here is the "farmer of the jungle" – he tills the soil. It is a worm. It plants fallen seeds by covering them with soil. I think the earthworm is the most important animal on earth, because he make spaces in the earth so air and water can get in.

• Let's find out some more things about the plants that we find in the "grass jungle." Here is some wild oat grass, etc. Can anybody tell me why grass is so important? That's right. Jimmy, the cow eats the grass and we drink the milk. We can make a whole meal of grasses. Grasses give us meat, bread, oatmeal for breakfast and cookies for snacks.

• Here is the red clover again, but this time there is a new visitor – it's a bumblebee. Some engineers say that a bumblebee shouldn't be able to fly. The body is too big, the wings are too small and the "wump" is too wide. Only the bumblebees don't know this and fly anyway.

• Who likes hot dogs and hamburgers? Here is a mustard plant. Who's been eating it? The deer! There are many plants eaten by both people and animals.

• Here is a plant that has lots of neighbors – you see, the leaves live opposite each other, the way people live opposite each other in houses in our neighborhood.

• We are coming to the end of our trip, because there's the big tree and the park sign. Why don't we rest under the tree. Can anybody name me five things we saw in the grass jungle today?

• Peter just asked me what a tree is good for. Answers: makes houses, telephone poles, flagpoles, holds the earth from slipping, birdhouse, books, newspapers, pencils. What do I think a tree is good for? You can blow your nose in it.

• Why don't we all stand up? How big you have grown since we took our trip in the grass jungle. And I think you are a lot smarter, too. Why don't we all go over together to read the park sign. Let's all read it together (in unison):

"Help Protect Your Nature Area – No Collecting Please"

• Question: Why should we not take anything out of the Nature Area? That's right, we have to leave things here so that all the boys and girls who come after us can have as much fun as we did, and the flowers and the animals will still be here next year. We who work in your parks need all the help we can get!

• Come back again and see us real soon, for these parks belong to you and your parents who pay taxes to support the East Bay Regional Parks. Isn't it wonderful to have a park for a friend? See you later.

Prepared by Joshua Barkin,
Supervising Naturalist, Tilden Park
East Bay Regional Park District

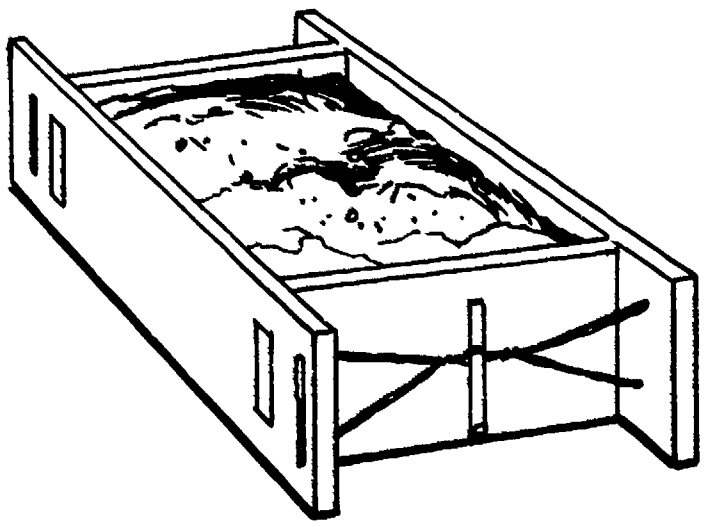
SCIENCE IN THE OUTDOORS	Suggested Correlation to Other Curriculum Areas							Environmental Relationships		
	Art	Physical and Mental Health	Language Arts	Mathematics	Music	Physical Education	Social Science	Physical	Biological	Social
Activities for Grades K-12										
Write inquiry questions for groups.			●					●	●	●
Sort leaves, devise classification system.				●				●	●	●
Identify plants, rocks, animals.			●					●	●	
Find temperature by counting cricket chirps.				●				●	●	
Find examples of the relationship between sun and life.							●	●	●	●
Observe the earth's rotation.				●			●	●		
Measure evaporation.				●				●		
Lay or follow a nature trail.		●				●	●	●	●	●
Observe hatching acorn larvae.									●	●
Learn geology in the field.							●	●		
Overcome fear of snakes.		●							●	●
Learn through observation age of tree, kind of tree, growth years, climatic history of area, reason for uneven growth, cambium layer, host to other plants and animal life, etc.							●		●	●
A-Z review of field experience – name one thing for each letter.			●					●	●	●
Collect water samples for microscopic examination.									●	
Study succession in a burned area.								●	●	
Collect insect galls on plants and observe emergence.									●	
Determine soil particle size by shaking with water and observing sedimentation.								●		
Observe sources of air pollution.							●	●	●	
Practice composting.							●		●	
Find examples of the relationship between water and life.							●	●	●	
Plant trees or flowers in urban area.							●	●	●	●

	Suggested Correlation to Other Curriculum Areas							Environmental Relationships		
	Art	Physical and Mental Health	Language Arts	Mathematics	Music	Physical Education	Social Science	Physical	Biological	Social
Activities for Grades K-3										
Use five senses to examine minutely–watch snails move.		●			●				●	●
Observe insects, animals–how they move, eat, etc.						●			●	
Look for similarities (discrimination)--shape, texture, size, etc.			●					●	●	
Decide what grows along a nature walk.			●					●	●	
Group natural objects–trees, fish, rocks.				●				●	●	
Find examples of how people, animals, and plants depend on each other.							●		●	●
Find animals at different stages of their life cycles.							●		●	
Observe ways that the sun affects life.							●	●	●	
Notice that different things live in different environments.							●	●	●	●
Color an animal to fit the place it would live, place the paper cutout there.	●								●	●
Describe local changes in the season -effect of rain, cold, etc., and tell how these changes affect us.								●	●	●
Compare structure of plants which stay green in dry seasons with those which turn brown.									●	
Collect different types of seeds and fruits.									●	
Observe methods of seed dispersal.									●	
Observe methods of animal locomotion–snails, millipedes, snakes, insects.									●	
Activities for Grades 4-6										
View the stars on a night trip, hear mythology about them.			●	●				●		●
Predict changes to follow tide, storm, dry spell.								●	●	●
Use telephone cable wire in 10" lengths to make 2" diameter circles, and use like hand lenses to examine a small bit of area.	●								●	●
Discover something of interest–each child leads group to his find. These are listed to be categorized.		●	●					●	●	●
Discover what plants and animals are native or imported.							●	●	●	●
Take blind walk in pairs–one leads a blindfolded partner, helping him "see."			●				●	●	●	●

	Suggested Correlation to Other Curriculum Area							Environmental Relationships		
	Art	Physical and Mental Health	Language Arts	Mathematics	Music	Physical Education	Social Science	Physical	Biological	Social
Find cycles in nature–food, water, nitrogen, etc.								●	●	
With a spring scale and float, measure water pull in narrow and wide part of stream–relate to electricity watts and volts.								●		
Compare plants on north and south slopes.							●	●	●	●
Take a station hike -lead child is assigned a post to explain.		●	●			●		●	●	●
Study a plot-chart with transparent overlays showing producers, consumers, decomposers. Describe homes, plant life, map, soil, death, erosion, living things.							●	●	●	●
Plot a grid in vacant lot, 10' sections, study ecology, use sampling.				●				●	●	●
Find plants that illustrate botanical corms–palmately compound.			●	●					●	●
Observe how trees are adapted for place where they grow.							●		●	●
Make a solar still.								●	●	●
Find temperature of water at different depths, relate to life in that place.				●				●	●	
Show how light affects plants, animals, and humans.								●	●	●
Notice animal uses of sound.					●			●	●	
Demonstrate wave action in water with a bucket.								●	●	
Explain effects of gravity on erosion, water flow.								●		
Show centrifugal force with a bucket.				●				●		
Set up and use a weather station. Committee keeps records, predicts weather. Relate to occupations.			●	●			●	●		●
Learn about chemistry in the environment.								●	●	
Dig to the water table.						●		●		
Stop soil and water erosion. Observe effect.							●	●		●
Determine whether mirror or magnifying lens is better if you are lost.				●			●	●		●
Study clouds.	●							●		
Make and use a water microscope.								●	●	
Find examples of land forms, mineral specimens.								●		
Find fossils–learn what they tell about an area.							●	●		●

	Suggested Correlation to Other Curriculum Areas							Environmental Relationships		
	Art	Physical and Mental Health	Language Arts	Mathematics	Music	Physical Education	Social Science	Physical	Biological	Social
Wade in a stream, find a variety of plants and animals, see how they are adapted, notice litter, measure flow of water, describe quality of water.		●					●	●	●	●
Study owl pellet or scat from hawk, coyote, fox, raccoon. What has been eaten? What lives in it? Reassemble skeleton of bird or rodent.									●	
Follow tracks, cast them in plaster.	●						●	●	●	●
Make a noose of long grass to catch a lizard (let him go).						●			●	●
Compare effects of plants on erosion.								●	●	
Construct a splash stick to observe effects of rain on soil erosion.	●							●		
Determine soil porosity by placing open-ended tin cans in soil and filling with water.								●		
Determine effects of exercise on respiration and pulse rates in humans.		●				●			●	
Observe effects of fertilizers on plant growth.				●				●	●	
Observe effects of pesticides on plant productivity.				●					●	
Construct an ant farm.									●	
Construct and observe a beehive.							●		●	●
Observe effects of wind on vegetation.							●		●	●
Activities for Grades 7-12										
Estimate distance by timing sound travel.				●	●			●		
Study wave motion in a pool.								●		
Trace the conservation of matter in food cycles.		●						●	●	
Observe different examples of symbiosis.							●		●	●
Determine an animal population by collecting, marking, re-collecting, and computing population.				●					●	
Identify trees by using identification keys.				●					●	
Visit a variety of ecological zones.			●					●	●	●
Apply the scientific method to social problems.							●			●

	Suggested Correlation to Other Curriculum Areas							Environmental Relationships		
	Art	Physical and Mental Health	Language Arts	Mathematics	Music	Physical Education	Social Science	Physical	Biological	Social
Classify birds observed according to migratory patterns; winter, summer, resident.				●			●		●	●
Predict and test effect on ecological niche by removing one species–mosquito.							●		●	●
Observe disease carriers, effect of heavy population on disease.		●							●	●
Watch a domestic pet that has been abandoned in a park.							●		●	●
Compare characteristics of monocots and dicots.									●	
Trap planaria for laboratory study.									●	
Construct topographic map of an area.				●			●	●		●
Determine and compare relative humidities.				●				●		
Study soil profile.								●		
Test acidity of soil and correlate acidity with vegetation.							●	●	●	●
Observe types of vegetation which grow in salt spray zone.							●	●	●	●



ADOBE CONSTRUCTION

Application: early California, Latin America, southwestern United States. Make a model rancho using small bricks or small section of wall of full-size bricks.

Materials: adobe clay, dishpan, dry grass or straw, mold (2 boards, 1x4x18; 2 boards, 1x4x10), water.

Process: Pound dry clay until fine and smooth. Mix water with clay in dishpan or shallow hole in ground. Add grass, place mold on clean ground or heavy paper, fill mold, tamp to fill voids. When partly dried, loosen mold and remove from brick. Turn bricks on edge after drying for full day. Complete drying in hot sun for several days. Lay bricks with layer of same adobe mixture between bricks.

Walls were usually protected by wide roof overhangs and walls were often plastered.

NOISE POLLUTION

One hundred decibels is a level that a high percentage of the population will find intolerable.

Federal Aviation Administration

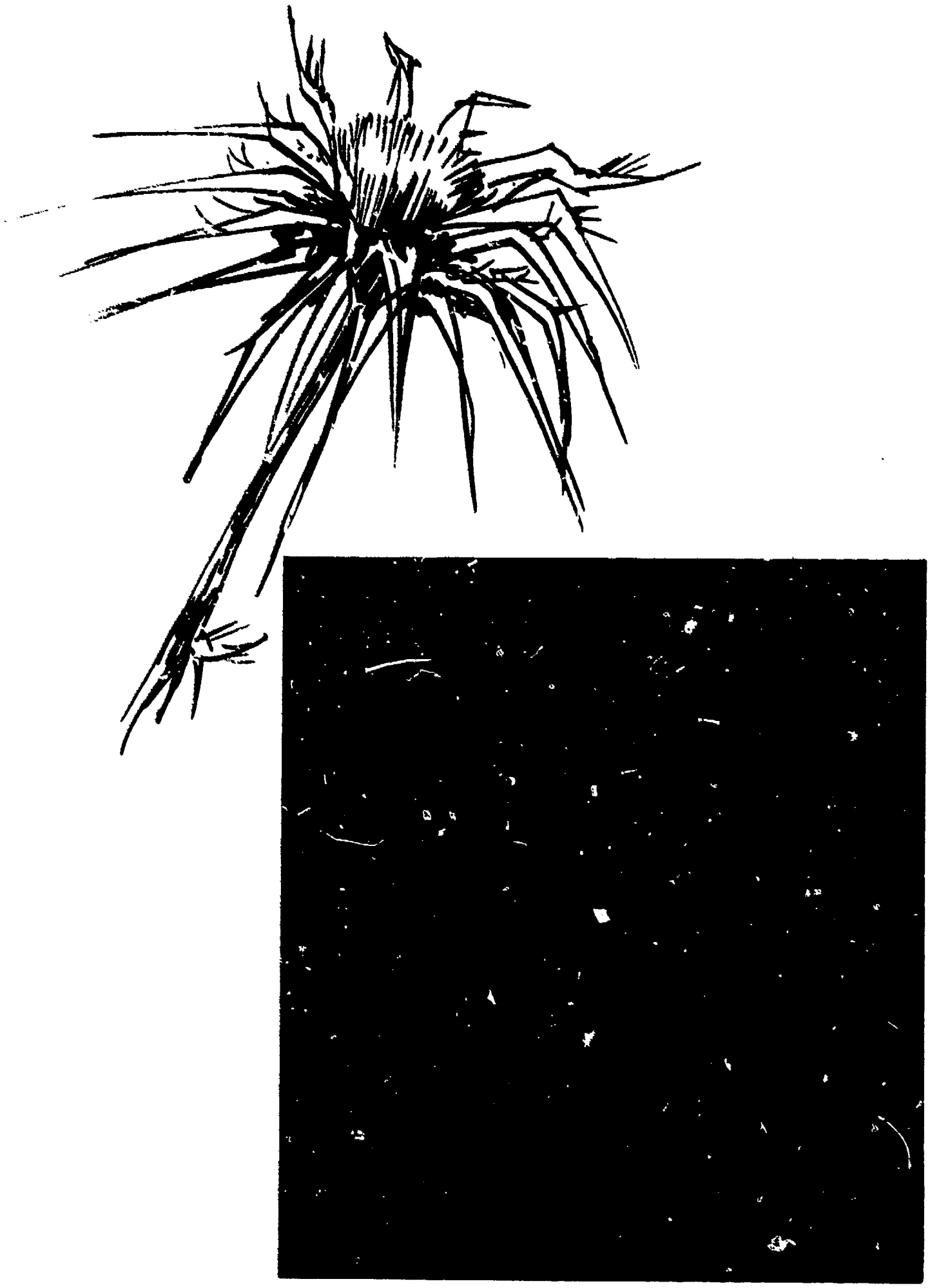
Relative Noise Levels

	Perceived Decibel Level
Room in a quiet city dwelling at night	32
Average city residence	40
Dishwasher	56-85
Small 2-engine private plane (sideline noise at 1500 feet)	80-85
Heavy truck – 25 feet away	90
Train whistle – 500 feet away	90
Food blender	93
Subway train – 20 feet away	95
DC-3 (sideline noise at 1500 feet)	95-100
Loud outboard motor	102
Loud motorcycle	110
Boeing 707, DC-8 (sideline noise at 1500 feet)	110-115
Rock 'n roll band playing at loudest moments	120
Large pneumatic 3" riveter	125
SST (sideline noise at 1500 feet)	120-129

SOCIAL SCIENCE IN THE OUTDOORS	Suggested Correlation to Other Curriculum Areas							Environmental Relationships		
	Art	Physical and Mental Health	Language Arts	Mathematics	Music	Physical Education	Science	Physical	Biological	Social
Activities for Grades K-12										
Discuss history of an area, observe pioneer routes, sites of early settlements.			●					●	●	●
Study a meadow as an example of a kind of community.			●				●	●	●	●
Wash hands with Indian soap plant bulb.							●		●	●
Locate local geography, industry, topography, water resources from a vista point.	●						●	●	●	●
Plant and tend a vegetable garden.	●						●	●	●	●
Plant and landscape school grounds.	●						●	●	●	●
Develop ability to get along in a cabin, apartment building, other group housing.		●						●	●	●
Find ways plants, animals and people adapt to their environments.							●	●	●	●
Work in committees--plan a cook-out.		●	●	●						●
Study unusual edible plants and animals							●		●	●
Observe all of the effects of man in a specified area.	●	●						●	●	●
Clean up a natural area.	●					●			●	●
Study and determine solutions to litter problem.		●								●
Visit a city dump and observe materials that could be recycled.										●
Activities for Grades K-3										
Learn names of topographical features.			●				●	●		●
Find animal communities.							●			●
Find plant communities.							●			●
Discover needs of animals and people.							●		●	●
Observe how people are affected by their environment and how they change it.								●	●	●
Study ranch life.			●							●
Investigate Indian uses for native plants; plants for food, clothes and medicines.			●				●		●	●
Collect litter, make a litter tree, chain, sculpture.	●	●		●				●		●

	Suggested Correlation to Other Curriculum Areas							Environmental Relationships		
	Art	Physical and Mental Health	Language Arts	Mathematics	Music	Physical Education	Science	Physical	Biological	Social
Activities for Grades 4-6										
Become acquainted with land forms–lakes, gullies, streams, washes, ditches, levels, hills.	●						●	●		●
Map school yard–children draw in proposed nature area.	●			●				●	●	●
Make a relief map using pegs, string, and level to circle small hill· draw pattern to scale.	●			●				●		
Make clay topographic map.	●			●				●		
Survival–what would we do if we had to stay here? Pretend to be an Indian tribe. Send out scouting parties to report back on basic needs (food, shelter, clothing, water, recreation).		●	●					●	●	●
Leave a trail to be sure to be followed; to be sure not to be followed.						●		●	●	●
Find direction with a watch.				●				●		
Discuss history–if a tree could talk.			●						●	●
Find water indicators–sycamores used by pioneers.							●	●	●	●
Compare fences–handmade and manufactured.								●	●	●
Make adobe brick.			●					●	●	●
Make pioneer food with native plants–anise cookies, horehound candy, acorn bread, madrone tea, he·ba buena tea, berry jelly (know the berries!)		●					●	●	●	●
Discover how many people an acre would feed.				●			●	●	●	●
Investigate how soil supports life–uses of soil.							●	●	●	●
Identify exotic plants–eucalyptus from Australia.							●	●	●	●
From vantage point, identify transportation routes, urban zoning.			●	●				●		●
Collect litter in pairs, weigh in on crude balance scale–twig and fulcrum. Prize to the collectors of most litter. Arrange according to length of time required to decompose.	●			●				●	●	●
Discuss law and man's use of resources.			●						●	
Understand likenesses and differences in ethnic groups within class by outdoor interchange of ideas.		●	●							●
Gather one beautiful non-living thing from each student, place on paper explaining why selected, then teacher burns it.	●	●						●	●	●
Write letters to influential people and organizations relating to value of natural resources.			●							●

	Suggested Correlation to Other Curriculum Areas							Environmental Relationships		
	Art	Physical and Mental Health	Language Arts	Mathematics	Music	Physical Education	Science	Physical	Biological	Social
Study trail maintenance.						●		●	●	●
Study effects of pesticides.							●	●	●	●
Investigate man-made waterwarp, power lines.								●		●
Study air, water pollution, excavating.							●	●	●	●
Circulate petitions or brochures relative to environmental problems.							●	●	●	●
Activities for Grades 7-12										
Understand climate and natural resources of an area.							●	●	●	●
Understand conflict of interest in use of resources.			●					●	●	●
Compare effects of population density in human and animal communities.				●					●	●
Observe biomes--north and south facing slopes.							●	●	●	●
Learn economic aspects of resource management.				●				●	●	●
Trace sources of pollution and take active steps to clean up air, water, and land. Letters to industrialists, congressmen, newspapers, interviews, community clean-up campaigns, petitions.		●	●			●		●	●	●
Develop a conservation ethic of moral responsibility for brotherhood.		●	●							●
Probe problems of local vs. state and federal regulations--oil regulations, water management.							●	●	●	●
Recognize importance of land use planning, observation of planned communities, prime agricultural land--planning commission, county ordinances.							●	●	●	●
Visit planned parenthood association--learn need for population control.			●				●		●	●
Investigate atomic energy and its effect on environment.							●	●	●	●
Compare sewage disposal systems.							●	●	●	●
Investigate water usage problems.							●	●	●	●
Determine human population density in a city block or some other area.		●		●					●	●
Visit a park and investigate consideration necessary for outdoor recreation planning.	●	●				●	●	●	●	●
Study economic and aesthetic loss of a burned area.		●		●						●
Circulate petitions or brochures relative to environmental problems.							●	●	●	●



POLICY GUIDELINES CONCERNING REQUESTS FOR INFORMATION ON CONSERVATION EDUCATION

The recent *Education Code* requirements relating to conservation instruction and the current interest in environmental problems have prompted a great amount of conservation education activity in the schools of California.

As a result of this very desirable interest on the part of teachers and students, there has been a tremendous increase in the amount of letters and requests for information sent to the various public agencies, industrial concerns and private conservation groups. All of these requests involve resources, money, materials and manpower to answer. Educators and students can practice good conservation as well as learn about it if they will exercise good judgment in requesting assistance from these agencies.

May we suggest that you observe the following:

- Check local sources first. Perhaps the information you desire is available from school or public libraries, the local chamber of commerce, or the local office of a state or federal organization.
- Be specific in your requests. Questions such as "What are you doing about pollution?" and vague requests such as "Send me everything on conservation" are difficult or impossible to handle properly.
- Direct your requests to the agency best suited to fill it. A guide to federal and state resource agencies is being prepared for early distribution to schools.
- Combine requests whenever possible. School or district orders for materials in quantity cost less to process than individual teacher or student requests. When possible, teachers should mail student letters as a group with a cover letter. This practice permits agencies, where appropriate, to answer several requests with one letter.
- Request what you will use, and use what you request.

From the California State Department of Education

GOVERNMENT AGENCIES

UNITED STATES

Department
Councils-Committees
Legislative Committees
Independent Offices and Establishments

CALIFORNIA

Agencies and Regional Offices
Councils-Commissions
Legislature
Regional Offices of State Agencies
Quasi-Governmental Regional Authorities

UNITED STATES OF AMERICA

Regional offices of departments, bureaus, establishments, councils, and committees whose actions and programs relate most directly to various environmental concerns are included. Many provide teaching aids on various grade levels – films, catalogues, charts, booklets, etc. All provide data on current issues in their jurisdictions as well as general program or referral information. *Important:* only specific questions or requests can receive helpful answers or response.

EXECUTIVE OFFICE OF THE PRESIDENT, WASHINGTON, D.C. 20500

Councils to advise the President, improve interagency coordination, provide leadership, develop programs:

- National Council on Marine Resources and Engineering Development
- Office of Science and Technology
- President's Council on Environmental Quality, 1016 16th Street, N.W., Washington, D.C. 20036

DEPARTMENTS

DEPARTMENT OF AGRICULTURE
630 Sansome St.
San Francisco, CA 94111
(unless otherwise noted)

Science and Education

Federal Extension Service
- Helps public interpret and apply to everyday problems the latest technology
- Provides technical and organizational assistance
- Conducts educational programs

State Extension Wildlife Specialist
University of California at Davis, CA 95616

Rural Development and Conservation

Forest Service
- Administers national forests and grasslands for multiple use, including recreation and outdoor education
- Carries on research and experimental programs
- Supplies information and teaching aids

Conservation Officer
Southwest Range and Experiment Station
1960 Addison St., Berkeley, CA 94701
556-0122

Pinchot Institute for Conservation Studies
Milford, PA 18336

- Publications and research on various aspects of conservation education

Soil Conservation Service
2020 Milvia St., Berkeley, CA 94704
841-5121

- Information, publications, teaching aids
- Soil and river basin surveys
- Watershed and flood protection
- Research experiment stations
- Technical aid and help in recreational development on watershed

DEPARTMENT OF COMMERCE
450 Golden Gate Avenue
San Francisco, CA 94102

Science and Technology

Environmental Sciences Services Administration
- Conducts programs with respect to weather
- Terrestrial and space investigations
- Basic and applied research, observations, processing, forecasts

Coast and Geodetic Survey
121 Customs House
San Francisco, CA 94126
556-5111

Weather Bureau
P.O. Box 2385
Oakland, CA 94614
562-8573

DEPARTMENT OF DEFENSE

Army Corps of Engineers
100 McAllister St.
San Francisco, CA 94102
- Maintains and repairs real property
- Operates utility plants and systems
- Plans, directs, and supervises projects and surveys other governmental agencies as

assigned (improvement of rivers, harbors, shore protection)

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE (REGION IX)
50 Fulton St.
San Francisco, CA 94102
556-3789

Public Health Service
556-5810

Consumer Protection and Environmental Health Service
556-1210
- Consolidates existing knowledge and advance research
- Establishes standards
- Assists state and local programs

Environmental Control Administration
556-8480
- Identifies and controls problems of man's environment

Bureau of Community Environment Management
Bureau of Solid Waste Management
Bureau of Water Hygiene

National Air Pollution Control Administration
556-4811
- Technical assistance, studies, and programs of research
- Development of criteria and standards
- Identification on control of pollutants

Bureau of Abatement and Control
Bureau of Engineering and Physical Sciences

Office of Education
760 Market St.
San Francisco, CA 94102
556-4920
- Facts and statistics showing educational conditions and progress
- Diffuses information to promote the high quality of education
- Administers grants for educational programs and facilities

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
681 Market St.
San Francisco, CA 94105
556-5900

Metropolitan Development
556-7534

Community Resources Development
- Programs and activities of financing, planning, acquisition, and development of open space, land, etc.

Land and Facilities Development Administration
556-8809
- Open space land program concerned with acquisition of space for public conservation and recreation uses

Research and Technology
- Provides technical assistance, studies, publications on open space

DEPARTMENT OF THE INTERIOR
450 Golden Gate Avenue
San Francisco, CA 94102

Fish and Wildlife: Parks and Marine Resources

Bureau of Commercial Fisheries
100 McAllister St.
San Francisco, CA 94102
556-7632
- Research management and conservation of key marine and inland fishery resources
- Technical aid

Bureau of Sports, Fisheries, and Wildlife
730 N.E. Pacific
Portland, Oregon 97232
- Manages national wildlife refuges and fish hatcheries
- Responsible for rare and endangered species
- Technical assistance

National Park Service
556-4122
- Plans development and management of National Park System
- Extensive information and interpretive services – now working with Office of Education on criteria for land use designation as a national environmental education landmark

Mineral Resources

Geological Survey
555 Battery St.
San Francisco, CA 94111
556-5627
- Conducts mapping, research on mineral and water resources and geologic structure
- Distributes maps and reports

Bureau of Mines
- Studies air and water pollution related to mineral use
- Develops model control regulations
- Advises regional groups
- Research development and conservation of mines and resources

Public Land Management

Bureau of Land Management
2800 Cottage Way
Sacramento, CA 95825
(916) 481-6100
- Manages federally owned lands under multiple use principles
- Conducts studies on open space, desert use
- Makes public domain available for lease, purchase, or environment improvement

BLM NEWSBEAT

Bureau of Outdoor Recreation
556-8713
- Helps coordinate federal plans and programs in outdoor recreation areas
- Technical aid in development of outdoor recreation resources

Outdoor Recreation ACTION

Water and Power Development
760 Market St.
San Francisco, CA 94102

Bureau of Reclamation
556-4303
- Plans construction and operation of water resource programs, e.g., Central Valley Project of California
- Water delivery for power and industrial uses with associated recreational uses, flood control

Water Quality and Research

Federal Water Quality Administration
760 Market St.
San Francisco, CA 94102
556-5876
620 Central Ave.
Alameda, CA 94501
273-7025
- Reviews state water quality standards
- Interstate enforcement activities
- Financial aid for municipal waste treatment projects
- Planned programs

DEPARTMENT OF TRANSPORTATION
800 Independence Ave., S.W.
Washington. D.C. 20590
- Develops and improves a coordinated national transportation system
- Stimulates technological advance

Urban Systems and Environment

Office of Environment Impact
- Develops innovative solutions in urban transportation
- Provides leadership in indication of environmental enhancement programs

U.S. Coast Guard
630 Sansome St.
San Francisco, CA 94111
556-0669
- Oceanographic data
- Search and rescue
- Navigational aids (including bridge placement approval)

Research and Technology
- Research and development relating to speed safety and economy of transportation

Office of Noise Abatement
- Concerned with noise generated by transportation equipment

Federal Aviation Administration
831 Mitten Rd.
Burlingame, CA 94010
692-2441
- Regulates air commerce for safety and development
- Air traffic control
- Promotes development of national airway system and airports

Federal Highway Administration
450 Golden Gate
San Francisco, CA 94102
556-1243
- Aids highway construction
- Vehicle safety
- Total operation and environment of the highway systems

Federal Railroad Administration
450 Golden Gate
San Francisco, CA 94102
556-6632
- Concerned with high speed, safety, efficiency
- Operates the Alaska railroad

[redacted]

Federal Committee on Pest Control
Washington, D.C. 20204
- Coordinates interdepartmental activities dealing with pests (controls - effects)
- Research and public information

Water Resources Council
1025 Vermont Ave. N.W.
Washington, D.C. 20005
- Coordinates plans on all governmental levels for developing comprehensive water and related land programs

[redacted]

Federal

Senate: Agriculture and Forestry
Appropriations
Commerce
Interior and Insular Affairs
Public Works

House: Agriculture
Appropriations
Interior and Insular Affairs
Interstate and Foreign Commerce
Merchant Marine and Fisheries
Public Works

[redacted]

Atomic Energy Commission
2111 Bancroft Way
Berkeley, CA 94704
841-5121
- Development and use of atomic energy for common defense and security
- Improve public welfare
- Increase standards of living

Federal Power Commission
441 G St., N.W.
Washington, D.C. 20426
- Allocates costs of certain federal projects
- Issues and administers licenses for planning construction and operation of non-federal, hydro-electric power projects
- Gathers, analyzes, and publishes data regarding electric power industry
- Determines and assesses headwater benefits charges
- Monitors and regulates gas and electricity rates, charges and services

National Academy of Sciences
2101 Constitution Ave.
Washington, D.C. 20418
- Promotes science and its use for general welfare
- Investigates, examines, experiments, advises federal governement

National Academy of Engineers
- Divisions on biology, behavioral sciences
- Exchange of information, conferences, research
- Responds to scientific and engineering problems

National Research Council
- Facilitates participation of broader representation of scientists
- Stimulates and supports research
- Applies sciences contributing to public welfare committees and conferences

National Institute of Environmental Health Sciences
9000 Rockville Pike
Bethesda, MD 20010
- Researches, disseminates, and exchanges information

National Science Foundation
1800 6th St.. N.W.
Washington, D.C. 20550
- Strengthens research and education in the sciences
- Awards grants for materials and equipment
- Encourages programs and teaching institutions

Smithsonian Institute
1000 Jefferson Dr., S.W.
Washington, D.C. 20560
- Program of research, study, education, training, development of collections, publications

National Museum of Natural History - Science Information Exchange
- Receives, organizes, and disseminates information about work in progress
- Determines most advantageous distribution of research funds
- Aids program administration avoiding unwarranted duplication

[redacted]

Agencies are involved in the programs and actions that will result in a negotiated settlement with our environment. Telephone directories, city and county offices will also provide contact with citizen advisory committees and commission members that are informed on events of local concern.

(R) Regional Office
* Commissions set policy carried out by the appropriate department

STATE OF CALIFORNIA
State Capitol
Sacramento, CA 95814

AGRICULTURE AND SERVICES AGENCY
1120 N St.
Sacramento, CA 95814
(916) 445-1935

(R) Department of Agriculture
- A service agency; does not engage in research, education or extension work

Department of Commerce
- Concerned with the production and development of the state's economy

BUSINESS AND TRANSPORTATION AGENCY
1120 N St.
Sacramento, CA 95814
(916) 445-1331
- Coordinates planning, forms policy

Department of Public Works
(916) 445-2201

(R)* Division of Highways
- Plans, supervises, controls, and maintains state highway systems

*HUMAN RELATIONS AGENCY
1120 W St
Sacramento, CA. 95814
(916) 445-6951
- Formulates and implements policy

Department of Public Health
2151 Berkeley Way
Berkeley, CA 94705
- Prevention of disease and provision of a healthful environment
- Environmental health and consumer protection service
- Nutritional science
- Sanitary engineering

RESOURCE AGENCY
1416 9th St.
Sacramento, CA 95814
(916) 445-5636 (unless otherwise noted)

(R) Air Resources Board
1108 14th St.
Sacramento, CA 95814
(916) 445-1511
- Responsible for quality of air
- Adopts standards, inventories pollution, evaluates effects
- Vehicles commissions

Bay Conservation and Development Commission
507 Polk St.
San Francisco, CA 94102
597-3686
- Issues and denies permits on fill of San Francisco Bay
- Provides some sewerline protection

Department of Conservation
(916) 445-3976
Division of Forestry
- Protects forests, watersheds, and grasslands
- Fire control
- Multiple use and research
- Management

(R) Division of Mines and Geology
- Discovery and orderly development of mineral resourses
- Planning for marine geological resources development
- Mineral Information Service

(R) Division of Soil Conservation
- Develops soil and water conservation plans
- Cooperates with local districts in projects and planning

(R)* Department of Fish and Game
(916) 445-3531
- Protects, preserves, propagates, and enhances species
- Issues permits and licenses for hunting, fishing
- Enforces laws
- Outdoor California

Marine Research Committee
Wildlife Conservation Board
445-8448

Department of Navigation and Ocean Development
(916) 445-6281
Division of Harbors/Watercraft
• Engineering and planning for needs of small craft facilities
Division of Oceans
• Shoreline protection and research

* **Department of Parks and Recreation**
P.O. Box 2390
Sacramento, CA 95821
(916) 445-2385
• Acquires, develops, and operates over 200 units in state park system
• Preserves and administers state recreation areas

Department of Water Resources
(916) 445-6582
• Constructs and operates water development system, formulates plans
• Research on flood control
• Plans associated recreational developments
• Studies saline conversion to fresh water

Division of Water Quality
• Information on quality of waste discharge requirements

Division of Water Rights
• Water diversion and use adjudications

(R) State Water Resources Control Board
(916) 445-1553
• Sets and enforces regulations and standards

Reclamation Board
(916) 445-9454
• Cooperates with the U.S. engineers in flood control
• Maintenance and operation of projects on the Sacramento and San Joaquin rivers

Division of State Lands
1020 12th St.
Sacramento, CA 95814
• Administers, sells, leases, or disposes of state lands (includes tide lands, submerged lands, swamp and overflow lands, and beds of navigable rivers and lakes
• Surveys boundaries
• Leases oil, gas, and mineral properties

[redacted]

COMMITTEES AND COMMISSIONS WORKING DIRECTLY WITH AGENCIES

BUSINESS AND TRANSPORT AGENCY
1120 N. St.
Sacramento, CA 95814
(916) 445-1331
Advisory Committee for a Master Plan on Scenic Highways
(916) 445-6554
• Consults, reviews, and advises

Highway Commission
• Adopts routes, allocates funds, authorizes sale of excess property, designates freeways

HUMAN RELATIONS AGENCY

Committee on Environmental Policy
1400 10th St.
Sacramento, CA 95814
(916) 445-4422

RESOURCES AGENCY

Advisory Committee on Marine and Coastal Resources
714 P St.
Sacramento, CA 95814
(916) 445-9873

Interagency Council on Ocean Resources
1416 9th St.
Sacramento, CA 95814
(916) 445-0530

State Lands Commissions
1020 12th St.
Sacramento, CA 95814
(916) 445-5488

[redacted]

DEPARTMENT OF EDUCATION
721 Capitol Mall
Sacramento, CA 95814
• Provides professional direction to maintain the quality of the school system
• Regulates elementary, secondary, and special schools

Bureau of Elementary and Secondary Education Conservation Officer
(916) 455-8150

ENVIRONMENTAL QUALITY STUDY COUNCIL
1400 10th St.
Sacramento, CA 95814
(916) 445-6411

PUBLIC UTILITIES COMMISSION
1111 Jackson St.
Oakland, CA 94607
464-1366
350 McAllister St.
San Francisco, CA 94102
557-0647
• Regulates intrastate rates and services (gas, electric, water)
• Fixes rates and fares
• Supervises services, safety

[redacted]

CALIFORNIA LEGISLATIVE OFFICES
Governor's Office
350 McAllister St.
San Francisco, CA 94102

CALIFORNIA LEGISLATIVE COMMITTEES

SENATE
Standing: Agriculture
Education
Health and Welfare
Natural Resources and Wildlife
Transportation
Water Resources
Select: Environmental Control
Rapid Transit
Salinity Intrusion

ASSEMBLY
Standing: Agriculture
Commerce and Public Utilities
Education
Health and Welfare
Natural Resources and Conservation
Transportation
Water
Select: Environmental Quality

Joint Legislative Committee on Open Lands

Select Committee on Environmental Quality (Proposal - Environmental Bill of Rights, March, 1970)

[redacted]

Bay Area Air Pollution Control District
939 Ellis St.
San Francisco, CA 94109
771-6000
• Enforces air control regulation by administration or court action
• Reports air pollution

Bay Area Council Soil Conservation District
5552 Clayton Rd.
Concord, CA 94521
682-2266

Department of Agriculture
Embarcadero and Mission
San Francisco, CA 94111
557-0640

Department of Fish and Game
3000 Ferry Building
San Francisco, CA 94111
557-2237

Division of Highways
150 Oak St.
Oakland, CA 94612
557-1840

Division of Mines and Geology
Ferry Building
San Francisco, CA 94111
557-0633

San Francisco Bay Area Rapid Transit District
814 Mission St.
San Francisco, CA 94103
986-1818
• To construct and operate a regional rapid transit system

San Francisco Bay Delta Water Quality Control Program
364 14th St.
Oakland, CA 94612
464-1134

San Francisco Regional Water Quality Control Board
364 14th St.
Oakland, CA 94612
464-1255
• Reports water pollution

QUASI-GOVERNMENTAL MUNICIPAL OR DISTRICT AUTHORITIES IN BAY REGION

Association of Bay Area Governments
Hotel Claremont
Berkeley, CA 94704
841-9730
- Regional Transport Study Committee
849-3223
- Bay View

Board of Commissioners, Port of Oakland
66 Jack London Square
Oakland, CA 94607
- Makes provisions for needs of commerce, shipping, navigation

East Bay Municipal Utility District
2130 Adeline St.
Oakland, CA 94623
835-3000
- Owns 27,000 acres of watershed land in Alameda and Contra Costa Counties, some available for environmental education use, subject to primary necessity of maintaining water supply and quality
- Filter plant visits

East Bay Regional Park District
11500 Skyline Blvd.
Oakland, CA 94623
531-9300
- Administers and maintains 25,000 acres of park and recreation areas in Contra Costa and Alameda Counties
- Operates extensive interpretive program through naturalist staff available to school districts

CONSERVATION ORGANIZATIONS

National-Western Organizations with Board Programs
Protective Organizations
Organizations with Specific Issues and Assets
Legal, Financial Groups
Special Outdoor Interest Groups
Youth-Oriented Groups
Active Subcommittees of Established Organizations

These citizen groups provide communication channels, resources of information and points of view with printed materials, speakers, films or slides, or through organization of meetings, conferences and programs. Many have regular or intermittent periodicals; others focus on fact and opinion concerning our changing environment.

NATIONAL AND REGIONAL ORGANIZATIONS

DEFENDERS OF WILDLIFE
200 N St., NW, Suite 201
Washington, D.C. 20036
Concerned with all efforts to protect wild animals against cruelty and unnecessary destruction.
Defenders of the Wildlife News

FEDERATION OF WESTERN OUTDOOR CLUBS
c/o Betty Hughes
Rt. 3, Box 172
Carmel, CA 93921
Promotes proper use, protection and enjoyment of outdoor resources for its 44-member organization.
Western Conservation Briefs

FRIENDS OF THE EARTH
451 Pacific Ave.
San Francisco, CA 94133
391-4270
Dedicated to preservation, restoration and rational use of the ecosphere.
Muir and Friends Newsletter

IZAAK WALTON LEAGUE OF AMERICA
1326 Waukegan Rd.
Glenview, IL 60025
Membership organization with many chapters and state divisions working cooperatively for the conservation and enjoyment of the out-of-doors; education materials available.
Outdoor America
San Francisco Bay Area Chapter
Box 701
Daly City, CA 94017
756-8500

NATIONAL AUDUBON SOCIETY
1130 Fifth Ave.
New York, NY 10028
Membership organization with eight chapters in the Bay Area, providing programs and scheduled field trips. Dedicated to advancement of public understanding of value and need of conservation; the relation of wise use of natural resources to human progress. Publishes charts, bulletins, kits, etc. available for purchase from Regional Offices.
Audubon Magazine, Audubon Field Notes, Audubon Leader
Western Regional Office
555 Audubon Place
Sacramento, CA 95821
(916) 481-5332

Bay Area Educational Services
1749-A Grove St.
Berkeley, CA 94709
849-1980
Resources for reference; lists, etc.

Bay Area Audubon Council
1749 Grove St.
Berkeley, CA 94709
549-1038
(Chapter representatives)

NATIONAL PARKS ASSOCIATION
1701-18th St., NW.
Washington, D.C. 20009
Protection and preservation of the National Park System scenic wilderness and general environment for ourselves and future generations. Some leaflets for school use.
National Parks

NATIONAL WILDLIFE FEDERATION
1412-16th St., NW.
Washington, D.C. 20036
Membership organization encouraging awareness of need for the wise use and management of the natural resources upon which the lives and welfare of men depend. Graduate student grants.
National Wildlife Magazine, Conservation News (general educational), *Conservation Report* (conservation legislative actions, status), *Ranger Rick's Nature Magazine*

Western Representative, James Ruch
4929 Paloma St.
Carmichael, CA 95608

California Wildlife Federation
2644 Judah St.
San Francisco, CA 94123
661-0137
California Wildlife

SCIENTISTS' INSTITUTE FOR PUBLIC INFORMATION
30 East 68th St.
New York, NY 10021
Aims to provide unbiased scientific information relevant to a variety of public issues.
Environment

Northern California Committee for Environmental Information
Box 761
Berkeley, CA 94701
842-6707
Enfo

SIERRA CLUB
220 Bush St.
San Francisco, CA 94104
981-8634
Devoted to study and protection of national scenic resources, particularly those of mountain regions.
Bulletin, National News Report

Northern California Regional Conservation Committee
Ed Royce, Chairman
842 S. Livermore Ave.
Livermore, CA 94550
447-5306

San Francisco Bay Chapter
Bill Simmons, Chairman
2700 Russ Bldg.
San Francisco, CA 94104
Yodeler

Loma Prieta Chapter
Del Dow, Chairman
1249 Cranberry Dr.
Sunnyvale, CA 94087
739-5647
Loma Prietan

THE NATURE CONSERVANCY
1522 K St.
Washington, D.C. 20005
Concerned with land conservation through private action; rallies the skills, techniques and funds actually necessary to save land.
The Nature Conservancy News

Western Regional Office
215 Market St.
San Francisco, CA 94105
989-3056

Northern California Chapter
Box 26383, Custom House Stn.
San Francisco, CA 94126
Newsletter

THE WILDERNESS SOCIETY
729-15th St., NW.
Washington, D.C. 20005
To defend and to increase knowledge of the wilderness, and how it may be best used and preserved in the public interest.
The Living Wilderness

Western Regional Office
5850 East Jewell Ave.
Denver, CO 80222

WILDLIFE MANAGEMENT INSTITUTE
709 Wire Bldg.
Washington, D.C. 20005
Membership organization promoting better use of natural resources for the welfare of the nation.
Outdoor News Bulletin

ORGANIZATIONS DEDICATED TO [illegible] NATURAL ASSETS

GENERAL INFORMATION

CALIFORNIA TOMORROW
Monadnock Bldg., 681 Market St.
San Francisco, CA 94105
Fosters educational awareness of California conservation problems.
Cry California

CONSERVATION COORDINATORS
Box 548
Menlo Park, CA 94025
Specializes in public relations for conservation issue oriented action programs.

ENVIRONMENTAL SCIENCE CENTER
5400 Glenwood Ave.
Minneapolis, MN 55422

WAVE HILL CENTER FOR ENVIRONMENTAL STUDIES
675 West 252nd St.
Bronx, NY 10471

BEAUTY, PARKS, OPEN SPACE

KEEP AMERICA BEAUTIFUL, INC.
99 Park Ave.
New York, NY 10016

CALIFORNIA ROADSIDE COUNCIL, INC.
2626 Ocean Ave.
San Francisco, CA 94132
681-6189
Statewide citizens' organization promoting natural beauty, billboard control and undergrounding of utilities. Regular bulletins and alerts.

PEOPLE FOR OPEN SPACE
384 Post St.
San Francisco, CA 94108
434-3958

REGIONAL PARKS ASSOCIATION
1001 Cragmont
Berkeley, CA 94708

PLACES

CALIFORNIA'S NATURAL AREAS COORDINATING COUNCIL
Box 670
Mill Valley, CA 94941
388-1221
In process of inventorying unique natural areas in California.

COMMITTEE OF TWO MILLION
760 Market St.
San Francisco, CA 94102
Concerned with wild scenic rivers system, particularly Eel, Trinity and Klamath Rivers.

DESERT PROTECTIVE COUNCIL
Box 33
Banning, CA 92220
Safeguards important desert areas.
Newsletter

FRIENDS OF AQUATIC PARK
1210 Shattuck Ave.
Berkeley, CA 94707

LEAGUE TO SAVE LAKE TAHOE
633 Battery St.
San Francisco, CA 94111
981-2338

SAVE OUR SEASHORE
2 Shell Ct.
Mill Valley, CA 94941
Complete acquisition of 31,000 acres of privately owned land within the boundaries of Pt. Reyes National Seashore.

[illegible]

CALIFORNIA NATIVE PLANT SOCIETY
2490 Channing Way, Rm. 202
Berkeley, CA 94704
524-3756
Sponsors student Native Plant Clubs. Annual sale of California Native Plant seedlings.
Newsletter

SAVE THE REDWOODS LEAGUE
114 Sansome St.
San Francisco, CA 94104
362-2352
Program of acquisition and preservation.
Bulletin

WILDFLOWER PRESERVATION SOCIETY
3740 Oliver St., NW
Washington, D.C. 20015

COASTLINE

AMERICAN SHORE AND BEACH PRESERVATION ASSOCIATION
Box 1246
Rockville, MD 20850
Newsletter

CALIFORNIA COASTAL ALLIANCE
Box 548
Menlo Park, CA 94205
322-6671

CALIFORNIANS ORGANIZED TO ACQUIRE ACCESS TO STATE TIDELANDS (COAST)
Box 3284
Santa Rosa, CA 95403
(707) 726-6219

NORTHERN CALIFORNIA ASSOCIATION TO PRESERVE BODEGA HEADWATERS AND HARBORS, INC.
314 Market St.
San Francisco, CA 94105
392-1320

SAN FRANCISCO BAY

ALAMEDA CONSERVATION ASSOCIATION
Box 341
Alameda, CA 94501

SAVE SAN FRANCISCO BAY ASSOCIATION
Box 925
Berkeley, CA 94701
849-3053
"Bay-Watchers" groups in Bay Area counties, comprised of representative of county conservation organizations.

SOUTH SF BAYLANDS PLANNING CONSERVATION AND NATIONAL WILDLIFE REFUGE COMMITTEE
c/o County Planning Dept.
70 W. Hedding St.
San Jose, CA 95110
299-2521

CONTRA COSTA-ALAMEDA COUNTIES

COMMITTEE OF ENVIRONMENTAL CONCERN
c/o Dr. William Landis
76 Santa Barbara Rd.
Pleasant Hill, CA 94523

CONTRA COSTA PARKS COUNCIL
P.O. Box 4322
Walnut Creek, CA 94596
Park Council News

CONTRA COSTA SHORELINE PARK COMMISSION
645 Cypress Point Rd.
Richmond, CA 94801
235-6717

ENVIRONMENTAL SCIENCES INSTITUTE
237 Bishop Ave.
Richmond, CA 94801
232-3116

RICHMOND CITIZENS PLANNING ASSOCIATION
3418 Stewarton Dr.
Richmond, CA 94801

WEST CONTRA COSTA CONSERVATION LEAGUE
1015 Lenc Pl.
Richmond, C. 94801

MARIN COUNTY

MARIN CONSERVATION LEAGUE
914 Fifth Ave.
San Rafael, CA 94901
456-1912

TAMALPAIS CONSERVATION CLUB
244 Pacific Bldg., 821 Market St.
San Francisco, CA 94103

NAPA COUNTY

CITIZENS FOR THE AGRICULTURAL PRESERVE
5690 Silverado Trail
Napa, CA 94558
224-1851

NAPANS OPPOSING WASTELANDS
1754-2nd St.
Napa, CA 94558

UPPER NAPA VALLEY ASSOCIATES
c/o Schransberg Winery
Calistoga, CA 94515

SAN MATEO COUNTY

COMMITTEE FOR GREEN FOOTHILLS
Box 11511
Palo Alto, CA 94306
360-7422
Green Foothills

COUNCIL FOR GOVERNMENTAL RESPONSIBILITY
2955 Summit Dr.
Hillsborough, CA 94010

SANTA CLARA

UNITED NEW CONSERVATIONISTS
487 Park Ave.
San Jose, CA 95110
Confederation of Ecology Clubs

SOLANO COUNTY

SOLANO COUNTY COMMITTEE FOR ENVIRONMENTAL INFORMATION
37 Corte Dorado
Benecia, CA 94510

BENECIANS FOR ENVIRONMENTAL ACTION
297 W."H" St.
Benecia, CA 94510
745-3247

[redacted]

[redacted]

CALIFORNIA ANTI-LITTER LEAGUE
333 Montgomery St.
San Francisco, CA 94104
989-5900

COASTAL COALITION
203 Segri Pl.
Santa Cruz, CA 95060
Fighting nuclear power plant sites.

DESERT BIGHORN COUNCIL
c/o William Graf
Dept. of Biological Sciences
San Jose State College
San Jose, CA 95114

FRIENDS OF THE SEA OTTER
Big Sur, CA 94920

GET OIL OUT (GOO)
Box 1513
Santa Barbara, CA 93102
965-1519
Fighting to prevent water oil slicks.

JENNER COASTSIDE COALITION
Box 64
Jenner, CA 95450
569-1674
River mouth dredging.

LEAGUE TO SAVE LAKE TAHOE
633 Battery St.
San Francisco, CA 94111
981-2338

LOCAL INITIATIVE FOR ENVIRONMENT
Box 56,
La Honda, CA 94020
851-0528
Re Pescadero Creek.

PRESERVATION OF THE TULE ELK
5512 Markland Dr.
Los Angeles, CA 90022

SAVE OUR VALLEY ACTION COMMITTEE
231 N. 1st St.
San Jose, CA 95113
Concerned with airport location/ impact.

SAVE THE COAST
117 Meadow Rd.
Santa Cruz, CA 95060
Santa Cruz to Half Moon Bay.

SCENIC ROADS ASSOCIATION
3030 Bridgeway
Sausalito, CA 94965
332-1664
Re Highway 1.

SOCIETY FOR THE PRESERVATION OF BIRDS
Box 293
Pacific Palisades, CA 90272
Promotes protection, understanding and appreciation of birds of prey.
The California Condor

SOUTH CROSSING ACTION TEAM
Box 548
Menlo Park, CA 94025
Opposes major highway bridge across SF Bay north of San Mateo Bridge.

ORGANIZATIONS FIGHTING SPECIFIC ISSUES

AIR POLLUTION

AIR CONSERVATION COMMITTEE
121 E. 11th St.
Oakland, CA 94606
Health Education Program of Tuberculosis and Heart Association of Alameda County.

CITIZENS AGAINST AIR POLLUTION
1611 Spruce
Berkeley, CA 94704

CLEAN AIR COORDINATING COMMITTEE
987 Via Seville
Livermore, CA 94550

PEOPLE AGAINST POLLUTION
1718 Mossbrook Ave.
San Jose, CA 95130

STOP SMOG COMMITTEE
300 Nevada Ave.
Richmond, CA 94801

VINE HILL CLEAN AIR COMMITTEE
14 Goree Ct.
Martinez, CA 94553

NOISE POLLUTION

CITIZENS LEAGUE AGAINST THE SONIC BOOM
19 Appleton St.
Cambridge, MA 03138

COALITION AGAINST THE SST
235 Massachusetts Ave., NE.
Washington, D.C. 20001
Passengers Informed on the SST
451 Pacific Ave
San Francisco, CA 94133
391-4270

LOS ALTOS HILLS NOISE ABATEMENT COMMITTEE
26379 Fremont Rd.
Los Altos Hills, CA 94022
948-9217

OVER POPULATION

PLANNED PARENTHOOD
482 W. MacArthur Blvd.
Oakland, CA 96609
654-3212, 654-7987

POPULATION CRISIS COMMITTEE
1730 K Street, NW.
Washington, D.C. 20006

POPULATION REFERENCE BUREAU
1775 Massachusetts Ave., NW.
Washington, D.C. 20036

ZERO POPULATION GROWTH (ZPG)
63 Castle Park Way
Oakland, CA 94611
531-9157
National Reporter

367 State St.
Los Altos, CA 94022

LEGAL, FINANCIAL GROUPS

POLITICAL ACTION GROUPS

CITIZENS COMMITTEE ON NATURAL RESOURCES
1346 Connecticut Ave., NW.
Washington, D.C. 20036
Concerned with legislative actions.

OPEN SPACE ACTION
Box 548
Menlo Park, CA 94025
322-6671
Alliance of conservation groups for specific legislation.

PEOPLE'S LOBBY
672-9th Ave.
San Francisco, CA 94118
752-8849
Legislative action on specific issues.

PLANNING AND CONSERVATION LEAGUE
909-12th St.
Sacramento, CA 95814
444-8716
Represents 92 affiliated organizations, has a fulltime lobbyist to press for environmental legislation on the state level.

SCIENTISTS FOR SOCIAL AND POLITICAL ACTION
Box 3704
Stanford, CA 94305
c/o Schwartz, Physics Dept.
University of California
Berkeley, CA 94720

ENVIRONMENTAL LAW CONCERNS

CONSERVATION LAW FOUNDATION
1 Court St.
Boston, MA 02108

CONSERVATION LAW SOCIETY OF AMERICA
Mills Tower
220 Bush St.
San Francisco, CA 94104

ENVIRONMENTAL DEFENSE FUND
P.O. Drawer 740
Stony Brook, NY 11790

ENVIRONMENTAL LAW SOCIETY
Stanford University Law School
Stanford, CA 94305
321-2300, x 3430

Hastings College of Law
198 McAllister
San Francisco, CA 94102
557-0448

Boalt Hall of Law
University of California
Berkeley, CA 94720
642-2277

NATIONAL ENVIRONMENTAL LAW SOCIETY
Box 3713
Stanford, CA 94305

FUNDS – GENERAL CONSERVATION

AMERICA THE BEAUTIFUL FUND
219 Shoreham Bldg.
Washington, D.C. 20006
Aims, "Nobody Loves a Litterbug"

BELLE W. BARUCH FOUNDATION
274 Madison Ave.
New York, NY 10016

CONSERVATION AND RESEARCH FOUNDATION
Box 1445, Connecticut College
New London, CT 06321
To encourage study and research; biological science, conservation of renewable natural resources.

CONSERVATION ASSOCIATES
1500 Mills Tower
220 Bush St.
San Francisco, CA 94104
981-4039
Concerned with evaluating and implementing programs and projects, e.g., "Sempervirens Fund."
Box 9294
Stanford, CA 94035
968-3668

CONSERVATION FOUNDATION
1250 Connecticut Ave., NW.
Washington, D.C. 20036
Privately supported organization for research, information, education.
Conservation Foundation Letter
Conservation Education Bulletin

J.N. "DING" DARLING FOUNDATION, INC.
c/o Central National Bank and Trust Co.
Des Moines, IA 50304
To initiate, guide, coordinate and expedite programs of research and conservation education.

RACHAEL CARSON TRUST FOR THE LIVING ENVIRONMENT
8940 Jones Mill Rd.
Washington, D.C. 20015
Clearinghouse of information on ecology of environment; scientist and laymen; research, education, supports litigation.

RESOURCES FOR THE FUTURE
1145-19th St., NW.
Washington, D.C. 20006
Education and research into wise use of natural resources. Grants, reports and statistics.
Resources

TRUSTEES FOR CONSERVATION
261 Kearny St.
San Francisco, CA 94108
392-2838
Raises money to advance legislative aims of conservation groups.

Foundations set up to accept gifts and donations for parks and programs.

CALIFORNIA STATE PARKS FOUNDATION
315 Montgomery St.
San Francisco, CA 94108
989-2212

REGIONAL PARKS FOUNDATION
11500 Skyline Blvd.
Oakland, CA 94619

SIERRA CLUB FOUNDATION
220 Bush St.
San Francisco, CA 94104

FUNDS – WILDLIFE FOCUS

MAX McGRAW WILDLIFE FOUNDATION
P.O. Box 194
Dundee, ID 60118
Conducts wildlife research and conservation education projects.

NORTH AMERICA WILDLIFE FOUNDATION
709 Wire Blvd.
Washington, D.C. 20005
Helps sponsor wildlife research with cooperating organizations.

RAPTOR RESEARCH FOUNDATION INC.
c/o Byron Harrell
University of South Dakota
Vermillion, S D. 57607
To stimulate, coordinate, direct and conduct research on biology and management of birds of prey.
Raptor Research News

WELDER WILDLIFE FOUNDATION
P.O. Box 1400
Sinton, TX 78387
Research and education fellowships to graduate students, sponsors selected.

SPECIAL INTEREST: SPORTS, HOBBYS, OUTDOOR RECREATION PROGRAMS OF OUTDOOR USE

WILDLIFE

ASSOCIATED SPORTSMEN OF CALIFORNIA
2644 Judah St.
San Francisco, CA 94122
564-6166

BOONE AND CROCKETT CLUB
c/o Carnegie Museum
440 Forbes Ave.
Pittsburgh, PA 15213
Especially concerned with big game protection.

CALIFORNIA ORNITHOLOGICAL SOCIETY
6424 Mt. Adelbert Dr.
San Diego, CA 92111
California Birds

COOPER ORNITHOLOGICAL SOCIETY
California Academy of Science
Golden Gate Park
San Francisco, CA 94118
The Condor, Pacific Coast Avifauna

DUCKS, UNLIMITED
525 Market St.
San Francisco, CA 94105
986-5885
Promotes and assists conservation of wild waterfowl habitats in the United States and Canada.

SAN FRANCISCO ZOOLOGICAL SOCIETY
San Francisco Zoo
Zoo Rd. and Skyline Blvd.
San Francisco, CA 94132
661-2023
Zoo News

SPORT FISHING INSTITUTE
719-13th St., NW.
Washington, D.C. 20005
Fish, research, education
SFI Bulletin

TROUT UNLIMITED
California Council
Box 2046, Customs House
San Francisco, CA 94126

WESTERN BIRD BANDING ASSOCIATION
c/o Virginia P. Coughren
747 Stafford Pl.
San Diego, CA 92107
Western Bird Bander

FIELD TRIPS – HIKING – DIVING

BAY AREA AUDUBON COUNCIL
1749 Grove St.
Berkeley, CA 94709
Trips listed in Chapter Bulletins.

Golden Gate - San Francisco, Northern Alameda County
Madrone - North Bay Counties
Marin - Marin County
Mt. Diablo - Contra Costa County
Ohlone - Southern Alameda County
Santa Clara Valley - Santa Clara County
Sequoia - San Mateo County
Stockton - San Joaquin County

CENTRAL CALIFORNIA COUNCIL OF DIVING CLUBS
President, Michael Wagner
2616 Forest Hills Dr.
San Jose, CA 95130
378-2282
CenCal News

NATIONAL CAMPERS AND HIKERS ASSOCIATION
Regional Conservation Director
40445 Foster
Fremont, CA 94538

BERKELEY HIKING CLUB
Box 147
Berkeley, CA 94701
Hobnail

CONTRA COSTA HILLS CLUB
306-40th St.
Oakland, CA 94609

SIERRA CLUB
220 Bush St.
San Francisco, CA 94104
Wilderness outings schedule
Bay Chapter schedules
Loma Prieta Chapter schedule

MISCELLANEOUS

CONTRA COSTA ASTRONOMICAL SOCIETY
153 Lawson Rd.
Kensington, CA 94704
525-0189

EAST BAY MINERAL SOCIETY
Box 1196
Oakland, CA 94604
Nodule

MYCOLOGICAL SOCIETY OF SAN FRANCISCO INC.
Josephine D. Randall Junior Museum
San Francisco, CA 94114
Newsletter

NORTHERN CALIFORNIA MALACOZOOLOGICAL CLUB
Dr. Rudolph Stohler
c/o Dept. of Zoology
University of California
Berkeley, CA 94720
Veliger

EMPHASIS ON INTERNATIONAL CONCERNS

AMERICAN COMMITTEE FOR INTERNATIONAL WILDLIFE PROTECTION
c/o Conservation Office
American Museum of Natural History
Central Park West/79th St.
New York, NY 10024

EAST AFRICAN WILDLIFE SOCIETY
P.O. Box 20110
Nairobi, Kenya, Africa

FRIENDS OF AFRICA IN AMERICA
330 S. Broadway
Tarrytown, NY 10591
Includes educational program associated with the conservation of wildlife in Africa, and special project WARN – Women Against the Ravishment of Nature.

FAUNA PRESERVATION SOCIETY
c/o Zoological Society of London
Regnets Park
London, NW, England
Concerned with world's endangered wildlife
Oryx

INTERNATIONAL COUNCIL FOR BIRD PRESERVATION
Neci Road
Old Lyme, Conn. 06371

INTERNATIONAL FISH AND GAME
852 California St.
San Francisco, CA 94108

INTERNATIONAL OCEANOGRAPHIC FOUNDATION
10 Rickenbacher Causeway
Virginia Key, Miami, FL 33149
Sea Frontiers

INTERNATIONAL UNION FOR CONSERVATION OF NATURE AND NATURAL RESOURCES
2000 P St., NW.
Washington, D.C. 20006
Bulletin
1110 Morges, Switzerland

JOHN MUIR INSTITUTE FOR ENVIRONMENTAL STUDIES
451 Pacific Ave.
San Francisco, CA 94133
New fields of research; proposed publishing venture, "The Earth's Wild Places."

WORLD WILDLIFE FUND
910-17th St.
Washington, D.C. 20036

STUDENT GROUPS AND INSTITUTES ASSOCIATED WITH COLLEGES–UNIVERSITIES

ACTIVE CONSERVATION TACTICS (ACT)
304 Eshelman Hall
University of California
Berkeley, CA 94720
642-4536

CENTER FOR ECOLOGY AND ENVIRONMENT STUDIES
San Francisco State College
1600 Holloway
San Francisco, CA 94132
469-1702

CONSERVATION CONSULTANTS
Stanford Graduate School of Business
Stanford, CA 94305

CONSERVATION–ECOLOGY CLUB
California State College
25800 Hillary St.
Hayward, CA 94542

CONSERVATION FORUM
San Jose State College
Biology Dept. S1000
San Jose, CA 95112

ENVIRONMENTAL SCIENCES INSTITUTE
San Jose State College
1255-7th Street
San Jose, CA 95114
294-6414, x 2760

HUMBOLDT ORGANIZATION FOR THE PRESERVATION OF THE ENVIRONMENT
Humboldt State College
Arcata, CA 95521

INSTITUTE OF ECOLOGY
University of California
Davis, CA 95616

INSTITUTE OF GOVERNMENTAL AFFAIRS
University of California
Davis, CA 95616

POPULATION AND ENVIRONMENT FORUM
Box 6508
Stanford, CA 94305
321-2300

ORGANIZATION OF PROGRESSIVE ENGINEERS
2734 Ashby Pl.
Berkeley, CA 94705
or 2412 Stuart, Apt. 3
Berkeley, CA 94705

STUDENT COUNCIL ON POLLUTION AND THE ENVIRONMENT
Student Advisory Committee to The Department of the Interior
760 Market St.
San Francisco, CA 94102
556-5876
Council coordinated through Federal Water Quality Administration.

STUDENT ENVIRONMENTAL CONFEDERATION
Box 6508
Stanford, CA 94305

STUDENTS FOR ECOLOGICAL AWARENESS
St. Mary's College
Moraga, CA 94575

GROUPS AND ESTABLISHMENTS EMPHAZING ACTION–INVOLVEMENT

BIOENVIRONMENT CLUB
2805 Fulton St.
Berkeley, CA 94705
845-9078
or: 2627 Virginia St.
Berkeley, CA 94709

BUILD THE EARTH
1718 Beverly Pl.
Berkeley, CA 94707
524-6324
Emphasis on women's role in total environmental living.

ECOLOGY ACTION
3029 Benvenue Ave.
Berkeley, CA 94709
843-1820
1370 Masonic St.
San Francisco, CA 94117
861-5533
Material published regularly in *Freedom News.*

ECOLOGY CENTER
Ecology Bookstore
2179 Allston Way
Berkeley, CA 94701
548-2220

937A Sir Francis Drake Blvd.
Kentfield, CA 94904
457-1742

Ecology Center Foundation
710 Montgomery
San Francisco, CA 94111
391-7664

Confederation of Ecology Centers
2175 Allston Way
Berkeley, CA 94701
548-2640

ENVIRONMENT PLANNING AND RESEARCH GROUP
Box 4293
Berkeley, CA 94704
652-2191

TERRA NOVA
Box 627
Kentfield, CA 94904
453-5653
Experiments in social and technological change - models for environment of future *Newsletter.*

ESTABLISHED ORGANIZATIONS WITH SUBCOMMITTEES APPLYING THEIR PARTICULAR TO ENVIRONMENTAL ISSUES

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE
1515 Massachusetts Ave., NW.
Washington, D.C. 20005
Science

AMERICAN ASSOCIATION OF UNIVERSITY WOMEN
7 branches in Alameda County, 9 branches in Contra Costa County.
Journal
Berkeley College Women's Club
2680 Bancroft Way
Berkeley, CA 94704
845-8311

BAY AREA INSTITUTE
9 Sutter St.
San Francisco, CA 94104
986-5690

CALIFORNIA CHAMBER OF COMMERCE
520 Capitol Mall
Sacramento, CA 95814

CALIFORNIA FEDERATION OF WOMEN'S CLUBS
1214 Vicentia Ave.
Corona, CA 91720

Exec. Sec: Hotel California
Van Ness Ave. and Kern St.
Fresno, CA 93721

President: CFWC Jrs.
4684 Black Ave.
Pleasanton, CA 94566

CALIFORNIA LEAGUE OF WOMEN VOTERS
126 Post
San Francisco, CA 94108
League of Women Voters of Bay Area
c/o Oakland League of Women Voters
P.O. Box 7176
Oakland, CA 94601
532-5499

GARDEN CLUBS OF AMERICA
598 Madison Ave.
New York, NY 10022
"It's Raining, It's Pouring," "Operation Teacher."
Piedmont Garden Club
244 Lakeside Dr.
Oakland, CA 94610

NATIONAL COUNCIL OF STATE GARDEN CLUBS
4401 Magnolia Ave.
St. Louis, MO 63110
California Garden Clubs, Inc.
12 Oak Ct.
Walnut Creek, CA 94596
Golden Gardens

EDUCATIONAL ACTION SOURCES

Programs
Junior Museums
Youth, Teachers and Potential Leaders

Places with Programs and Natural Features
Museums, Laboratories, Gardens, Sanctuaries, Parks, and Monuments

Curriculum
Plans, Aids, Material Sources and Consulting Services
Organized Youth Groups

The blackboards, textbooks, and tools of environmental education are the cracks in the pavement, the tree, lawn, fence and bungalow steps of the school grounds; the nature interpretive programs, conferences and workshops of community and public establishments; and the societies, institutes and associations providing curriculum frameworks, plans, studies and materials.

JUNIOR MUSEUMS

Extensive programs on and off sites, animal lending libraries, seminars and courses.

ALEXANDER LINDSAY JR. MUSEUM
1901 First Ave.
Walnut Creek, CA 94596
935-1978

CALIFORNIA JUNIOR ACADEMY
California Academy of Sciences
66 Park St.
San Francisco, CA 94118
221-5100

HAYWARD ART AND SCIENCE CENTER
Sulphur Creek Park
1801 D St.
Hayward, CA 94541
581-6331, x58

JOSEPHINE D. RANDALL JUNIOR MUSEUM
Roosevelt Way and 16th St.
San Francisco, CA 94114
863-1339

JUNIOR CENTER OF ARTS AND SCIENCE
3612 Webster St.
Oakland, CA 94609
655-3226

LOUISE A. BOYD NATURAL SCIENCE MUSEUM
76 Albert Park Lane
San Rafael, CA 94901
454-6961

PALO ALTO JUNIOR MUSEUM
1451 Middlefield Rd.
Palo Alto, CA 94901
329-2111

ROTARY NATURAL SCIENCE CENTER
Lake Merritt
Oakland, CA 94612
273-3739

SAN MATEO COUNTY JUNIOR MUSEUM
Coyote Point
San Mateo, CA 95013
341-1361

YOUTH SCIENCE INSTITUTE
16260 Alum Rock Ave.
San Jose, CA 95127
258-4322, 258-7382

PROGRAMS FOR YOUTH, TEACHERS AND POTENTIAL LEADERS

ASSOCIATION FOR OUTDOOR EDUCATION
731 S. Hope St.
Los Angeles, CA 90017
Secretary: 2428 Walnut Blvd.
Walnut Creek, CA 94596

AUDUBON NATURE TRAINING–URBAN ECOLOGY
1749-A Grove St.
Berkeley, CA 94709
549-1038
Environmental Education for Elementary Teachers with Cal State, Hayward: extension course 5911, 1½ units

AUDUBON STUDENT NATURALIST PROGRAMS
12546 El Merrie Del Dr.
San Fernando, CA 91342
Pioneer Naturalist

BIOLOGICAL FIELD STUDIES ASSOCIATION
6389 Racine
Oakland, CA 94609
652-8276
Educational trips to Cleary Reserve, Napa County.

CALIFORNIA INSTITUTE OF MAN IN NATURE
Box 392
Berkeley, CA 94704
548-2220
Coordinates field trips across California for Bay Area schools.

HUSICON (Humanities, Science, Conservation)
2635 Mira Vista Dr.
El Cerrito, CA 94530
Husicon Twig: Resident camp experiences, elementary level.

JUNIOR RANGERS
East Bay Regional Parks
Tilden Nature Area
Berkeley, CA 94708
524-1034

LOS ANGELES STATE AND COUNTY ARBORETUM
301 N. Baldwin Ave.
Arcadia, CA 91006
School cooperative planting program.

MONLUX SCIENCE CENTER
6155 Bellaire Ave.
North Hollywood, CA 91606
Scripts, packets, teacher suggestions.

NATURAL SCIENCE
Educational Resources
Box 588
Ross, CA 94957
456-3754

NORTH SAN JOAQUIN VALLEY COUNTIES SUPPLEMENTARY EDUCATION CENTER
222 E. Weber Ave.
Stockton, CA 95202
In planning stages.

OUTDOOR EDUCATION PROJECT
136 S. Temple
Salt Lake City, UT 84101
Journal of Health, Physical Education, Recreation

SCICON
Tulare Dept. of Education
202 County Civic Center
Visalia, CA 93277
On-going resident camp.

STUDENT CONSERVATION ASSOCIATION, INC.
Sagamore Hill, National Historical Site
Oyster Bay, Long Island, NY 11771
Conducts and operates program of work and conservation in cooperation with U.S. Parks and Forest Service; provides scholarships.

TRAILFINDERS, INC.
P.O. Box 716
Banning, CA 92220
Instructs youth groups in outdoor and conservation education.

URBAN NATURE INSTITUTE FOR YOUTH
215 Market St., Suite 1118
San Francisco, CA 94105
421-1759
Art and ecology camping program for privileged and underprivileged children ages 8-12; teaches environmental awareness.

PLACES WITH PROGRAMS AND NATURAL FEATURES

Visit reservations must be made well in advance. Requests for information must be specific. Resource personnel are available at some sites.

AUDUBON CANYON RANCH (National Park Landmark)
Shoreline Highway, Rt. 1
Stinson Beach, CA 94970
868-0563

CHABOT OBSERVATORY
4917 Mountain Blvd.
Oakland, CA 94619
654-3217

CITY PARKS, RECREATION DEPARTMENTS, MARINAS

BERKELEY
644-6530
Codornices - Euclid and Eunice
John Hinkel - Indian Rock and Southampton
Live Oak - Shattuck and Berryman
EL CERRITO
525-4422
Arlington - Arlington and Thorsbay
234-9631
Canyon Trail - Mira Vista and Gatto Ave.
234-9602
OAKLAND
273-3296
Joaquin Miller - Joaquin Miller Rd. and Skyline Blvd.
531-2205
Dimond Park - Liemert and Park Blvds.
531-7055
Lake Merritt - Bellevue Ave. and Perkins
273-3739
Redwood Heights - Redwood Rd.
531-2142
RICHMOND
232-1212
Alvarado - east end McBryde
237-2732
Keller Beach - Garrard and Western Dr.
SAN LEANDRO MARINA
638-4100
40 San Leandro Marina
WALNUT CREEK
935-3300
Heather Pond - Ignacio Valley and Sheppard Rd.

ALAMEDA COUNTY PARK DISTRICTS

HAYWARD AREA RECREATION/PARK DISTRICT
1015 E St.
Hayward, CA 94543
581-6331

VALLEY COMMUNITY SERVICES
7051 Dublin St.
San Ramon, CA 94583
828-0515

DIABLO VALLEY COLLEGE SCIENCE CENTER
321 Golf Club Rd.
Pleasant Hill, CA 94523
685-1230

EAST BAY REGIONAL PARKS DISTRICT
11500 Skyline Blvd.
Oakland, CA 94619
531-9300

Naturalist Services and Programs -
Alameda Beach - Alameda and McKay
Briones - Orinda and Bear Creek Rd.
Tilden Nature Center - Berkeley and Spruce
For above call 524-1034
Coyote Hills - Fremont: Jarvis to Newark
Del Valle - Livermore: Tesla to Mines Rd.
Sunol (Camp Ohlone) - Sunol: Calaveras to Geary Rd.
For above call 862-2244

Regional Park Areas for Study Experiences - Maps and information, call 531-9300
Anthony Chabot - Skyline Blvd., San Leandro
Don Castro - Woodroe, Hayward
Las Trampas - Bollinger Canyon
Redwood - Skyline Blvd., Oakland
Robert Sibley - Skyline Blvd., Oakland

GOLDEN GATE PARK
San Francisco, CA 94118

California Academy of Sciences
221-5100
Pacific Discovery

Morrison Planetarium
[illegible] 752-8268
[illegible] Arboretum
[illegible]

KNOWLAND STATE ARBORETUM AND PARK ZOO
98th Ave. and Mountain Blvd.
Oakland, CA 94603
568-2470

HARBOR TOURS, INC.
Pier 43½ Embarcadero St.
San Francisco, CA 94111
362-5414

MARINE FLOATING LABORATORY PROJECT
Ocean Services
437 California Ave.
Palo Alto, CA 94306
328-6262

OAKLAND PUBLIC MUSEUM
Natural Science Division
1000 Oak St.
Oakland, CA 94607
273-3884

POINT REYES BIRD OBSERVATORY
Palomarin Ranch, Mesa Rd.
Bolinas, CA 942024
868-1221

RICHARDSON BAY SANCTUARY
National Audubon Society
376 Greenwood Beach Rd.
Tiburon, CA 94920
388-2524

SAN FRANCISCO BAY MODEL
Army Corps of Engineers
2100 Bridgeway
Sausalito, CA 94965
332-3870

STANFORD RESEARCH INSTITUTE BIO-SONAR LABORATORY
Coyote Hills Regional Park
471-1220

TILDEN BOTANICAL GARDENS
Tilden Park
Berkeley, CA 94708
841-1244

U.C. BOTANICAL GARDENS
North Canyon Rd.
Berkeley, CA 94720
642-3343

STATE AND NATIONAL SITES, PARKS, MONUMENTS

Maps, materials, naturalists.

ANGEL ISLAND STATE PARK
Angel Island
Tiburon, CA 94920
435-0122

JOHN MUIR NATIONAL HISTORICAL SITE*
4202 Alhambra Ave.
Martinez, CA 94553
228-8860

MOUNT DIABLO STATE PARK
Diablo, CA 94528
837-2525

MOUNT TAMALPAIS STATE PARK
801 Panoramic Way
Mill Valley, CA 94941
388-2070

MUIR WOODS NATIONAL MONUMENT*
Mill Valley, CA 94941
388-2595
*Refer to Environmental Education Officer, National Park Service, 556-2226.

POINT REYES NATIONAL SEASHORE
Point Reyes, CA 94956
669-1250
Drakes Beach
Inverness, CA 94937
669-1250

SAMUEL P. TAYLOR STATE PARK
Lagunitas, CA 94938
453-7604

STINSON STATE BEACH
Stinson Beach, CA 94970
868-1922

TOMALES BAY STATE PARK
Inverness, CA 94937
669-1140

CURRICULUM; PLANS, AIDS, MATERIAL SOURCES AND CONSULTING SERVICES

AMERICAN CAMPING ASSOCIATION
Bradford Woods
Martinsville, IN 46151

AMERICAN HUMANE EDUCATION SOCIETY
180 Longwood Ave.
Boston, MA 02115
Conducts day camp programs; leaflets.

AMERICAN INDIAN HISTORICAL SOCIETY
1451 Masonic Ave.
San Francisco, CA 94117
626-5235

AMERICAN NATURE STUDY SOCIETY
1501 Granada
Ann Arbor, MI 48103

ASSOCIATION OF INTERPRETIVE NATURALISTS
Western Interpreters Association
c/o San Mateo County Junior Museum
Coyote Point, San Mateo, CA 94401
The Interpreter

CALIFORNIA CONGRESS OF PARENTS AND TEACHERS
940 Georgia St.
Los Angeles, CA 90015
Local:
24749 Joyce St.
Hayward, CA 94544
886-4742
or
3865 Maybelle Ave., No. A
Oakland, CA 94619
534-8000

CALIFORNIA CONSERVATION COUNCIL
2604 E. Villa Ave.
Pasadena, CA 91107
Conservation Commentary

CONSERVATION CONSULTANT SERVICES
Box 419
Boulder Creek, CA 95006

CONSERVATION EDUCATION ASSOCIATION
1250 Connecticut Ave., NW.
Washington, D.C. 20036
Newsletter

CENTER FOR THE STUDY OF DEMOCRATIC INSTITUTIONS
Conservation Division
Box 4068
Santa Barbara, CA 93103

EARTH SCIENCE CURRICULUM PROJECT
Box 1559
Boulder, CO 80301
Terminated operations April 1970 but continues production of materials and aids.

EDUCATIONAL CONSULTING SERVICE
No. 6 Country Club Plaza
Orinda Village, CA 94563

ELEMENTARY SCIENCE STUDIES
Educational Development Center
Newton, MA 02158

ELEMENTARY SCHOOL SCIENCE ASSN.
Northern California Branch
c/o Alameda County Schools
224 W. Winton Ave.
Hayward, CA 94544
ESSA Newsletter

ENVIRONMENTAL EDUCATION CLEARING HOUSE
Box 2422
San Diego, CA 92112

FAR WEST LABORATORY FOR EDUCATIONAL RESEARCH AND DEVELOPMENT
Hotel Claremont
1 Garden Circle
Berkeley, CA 94705
841-9710

NATIONAL ASSOCIATION OF BIOLOGY TEACHERS
1420 N St., NW
Washington, D.C. 20005
American Biology Teacher

NATIONAL AUDUBON SOCIETY
Nature Centers Division
1130 Fifth Ave.
New York, NY 10028
Newsletter

NATIONAL SCIENCE FOR YOUTH FOUNDATION
114 East 30th St.
New York, NY 10016

NATIONAL SCIENCE TEACHERS ASSOCIATION
1201-16th St., NW.
Washington, D.C. 20036
Science and Children, The Science Teacher

OUTDOOR EDUCATION ASSN., INC.
606 S. Marion St.
Carbondale, IL 62901

SCIENCE CURRICULUM IMPROVEMENT STUDY
Lawrence Hall of Science
University of California
Berkeley, CA 94720
642-4541
Newsletter

SCIENCE EDUCATION INFORMATION ANALYSIS CENTER
Educ. Resources Information Center
1460 West Lane Ave.
Columbus, OH 43221
Newsletter

ASPEN CENTER FOR ENVIRONMENTAL STUDY
Thorne Ecological Foundation
1229 University Ave.
Boulder, CO 80302
Intensive seminars, Junior Natural Science Schools.

WARD'S OF CALIFORNIA
P.O. Box 1749
Monterey, CA 93940
Bulletin

WOODS HOLE OCEANOGRAPHIC INSTITUTE
Woods Hole, MA 02543
Program materials

SCHOOL RESOURCE VOLUNTEERS

OAKLAND COMMITTEE OF RESOURCE VOLUNTEERS
836-2622, x741

BERKELEY SCHOOL RESOURCE VOLUNTEERS
524-7336

RICHMOND SCHOOL VOLUNTEER PROGRAM
234-3825, x205

EXPERT ADVICE ON SPECIFICS

CALIFORNIA STATE COLLEGE, HAYWARD
Hayward, CA 94542
Biological Sciences
538-8000, x456
Earth Sciences
538-8000, x312
Ecological Field Station, Garin Ranch
538-8000, x595

UNIVERSITY OF CALIFORNIA, BERKELEY
Berkeley, CA 94720

Agriculture Extension
University Hall, rm 90
642-0780

Forestry-Ecology
163 Mulford Hall
642-1546

Seismographic Station
Earth Sciences Bldg.
642-4977

School of Environmental Design
230 Wurster Hall
642-1463

Zoology/Botany
Life Sciences Bldg.
642-3281

PERALTA COLLEGES

College of Alameda
555 Atlantic Ave.
Alameda, CA 94501
522-7291

Laney College
900 Fallon St.
Oakland, CA 94606
834-5740

Merritt College
5714 Grove St.
Oakland, CA 94609
655-6110

ORGANIZED YOUTH GROUPS

BOY SCOUTS OF AMERICA
San Francisco Bay Area
7th Ave. and E. 14th St.
Oakland, CA 94606
834-9660

CAMPFIRE GIRLS
Alameda-Contra Costa Council
2363 Boulevard Circle
Walnut Creek, CA 94596
933-6322

GIRL SCOUTS OF AMERICA
San Francisco Bay Council
1400-7th Ave.
Oakland, CA 94606
834-4844

PROFESSIONAL GROUPS

Wildlife, General Ecology
Associations, Institutions, Specialists and Councils

With membership representing the leaders in their particular fields, these associations and societies operate as a medium of exchange of professional thought, a clearing-house for information, and an implementation of the advancement and standards of their professions. They may also encourage cooperation among various agencies through meetings, conferences and various publications.

WILDLIFE—ECOLOGY—[illegible]

AMERICAN CETACEAN SOCIETY
4725 Lincoln Blvd.
Marina Del Rey, CA 90291
The Whalewatcher

AMERICAN FISHERIES SOCIETY
1040 Washington Bldg.
15th Street and N.Y. Ave., NW.
Washington, D.C. 20005
Transactions of....

AMERICAN LITTORAL SOCIETY
c/o Sandy Hook
Highlands, NJ 07732
Underwater Naturalist

AMERICAN ORNITHOLOGISTS' UNION
Bureau of Sport Fisheries and Wildlife
U.S. Department of the Interior
Washington, D.C. 20240
The Auk

AMERICAN SOCIETY OF ICHTHYOLOGISTS AND HERPETOLOGISTS
California Academy of Sciences
Golden Gate Park
San Francisco, CA 94118
Copeia

AMERICAN SOCIETY OF MAMMALOGISTS
American Museum of Natural History
Central Park West/79th St.
New York, NY 10024
Journal of Mammalogists

THE WILDLIFE SOCIETY
Bay Area Chapter
4302 Rose Lane
Concord, CA 94502
556-8240
Journal of Wildlife Management, Wildlife Society News

PLANTS, LAND AND WATER

AMERICAN FORESTRY ASSOCIATION
Monadnock Bldg., Rm. 874
681 Market St.
San Francisco, CA 94111
American Forests

AMERICAN SOCIETY FOR RANGE MANAGEMENT
2120 S. Birch St.
Denver, CO 80222
Journal of Range Management

AMERICAN SOCIETY OF LIMNOLOGY AND OCEANOGRAPHY, INC.
Museum of Natural History
Smithsonian Institute
Washington, D.C. 20560

AMERICAN SOCIETY FOR OCEANOGRAPHY
854 Main Bldg.
Houston, TX 77002
American Oceanography

INTERNATIONAL SHADE TREE CONFERENCE
1827 Neil Ave.
Columbus, OH 43210
Arborist News

NATIONAL RECLAMATION ASSOCIATION
303 Bank of America Bldg.
Visalia, CA 93277
Reclamation News

NATIONAL SPELEOLOGICAL SOCIETY
203 Virginia Hills Ave.
Alexandria, VA 22314

OPEN SPACE INSTITUTE
145 East 52nd St.
New York, NY 10022

SOCIETY OF AMERICAN FORESTERS
1010-16th St. NW.
Washington, D.C. 20006
Journal of Forestry

SOIL CONSERVATION SOCIETY OF AMERICA
835-5th St.
Des Moines, IA 50309
or 2855 Telegraph
Berkeley, CA 94705
Journal of Soil & Water Conservation

WESTERN FORESTRY AND CONSERVATION ASSOCIATION
1326 American Bank Bldg.
Portland, OR 97205
Exchanges forest and conservation information, furthers cooperation between government and private forestry organizations.

[redacted]

AMERICAN GEOGRAPHICAL SERVICE
Broadway at 156th St.
New York, NY 10032

ECOLOGICAL SOCIETY OF AMERICA
c/o Department of Zoology
Arizona State University
Tempe, AZ 85251

ENVIRONMENTAL RESEARCH INSTITUTE
Box 156
Moose, WY 83012
Professionals exploring cause-effect relations of man and environment; emphasis on interdisciplinary studies.

NATIONAL GEOGRAPHIC SOCIETY
1145-17th St., NW.
Washington, D.C. 20036
National Geographic, National Geographic School Bulletin

ASSOCIATIONS, INSTITUTIONS, SPECIALISTS AND COUNCILS

PROFESSIONAL ASSOCIATIONS, GOVERNMENT AGENCIES

AMERICAN ASSOCIATION FOR CONSERVATION INFORMATION
c/o Idaho Fish and Game Department
Box 25
Boise, ID 83707
The Balance Wheel - Facilitates exchange of ideas, materials from various states' conservation officers.

CALIFORNIA ASSOCIATION OF SOIL CONSERVATION DISTRICTS
Route 1, Box 578
Dixon, CA 95620

IRRIGATION DISTRICTS ASSOCIATION OF CALIFORNIA
11th and L Bldg.
Sacramento, CA 95814
Chart - "California Water Resources Development," *Western Water News.*

NATIONAL ASSOCIATION OF COUNTIES
1001 Connecticut Ave., NW.
Washington, D.C. 20036
"Community Action on Pollution."

U.S. SOIL CONSERVATION DISTRICTS
Alameda County
66 South P St.
Livermore, CA 94550
682-2266
and
Contra Costa County
5552 Clayton Rd.
Concord, CA 94521
682-2266

INSTITUTIONS

AMERICAN ASSOCIATION OF BOTANICAL GARDENS AND ARBORETUM
University of Washington Arboretum
Seattle, WA 98105

AMERICAN ASSOCIATION OF ZOOLOGICAL PARKS AND AQUARIUMS
Oglebay Park
Wheeling, WV 26003

NATIONAL PARK AND RECREATION ASSOCIATION
San Francisco Bay Area Committee
405 Montgomery St.
San Francisco, CA 94104
Park and Recreation Magazine; Newsletters, public information, program and research service.

COUNCILS

AMERICAN CONSERVATION ASSOCIATION
30 Rockefeller Plaza
New York, NY 10020
Educational and scientific organization; non-membership, non-profit.

NATIONAL RESOURCES COUNCIL OF AMERICA
719-13th St., NW.
Washington, D.C. 20005
Representatives of major national and regional conservation organizations; provides organizations with information and scientific data on conservation problems.

SPECIALISTS

ASSOCIATION OF CONSERVATION ENGINEERS
Department of Fish and Game
600 S. Walnut St.
Boise, ID 83707
Recognition of sound engineering practices in fish, wildlife and recreation

JOINT COUNCIL ON ECONOMIC EDUCATION
2 West 46th St.
New York, NY 10036
Publications on the economic impact on natural resources.

OUTDOOR WRITERS' ASSOCIATION OF AMERICA
Outdoors Bldg.
Columbia, MO 65201

GENERAL

AMERICAN CHEMICAL SOCIETY
1155-16th St., NW.
Washington, D.C. 20036

AMERICAN INSTITUTE OF BIOLOGICAL SCIENCES
3900 Wisconsin Ave., N W.
Washington, D.C. 20016
Bio Science

AMERICAN PLANNING AND CIVIC ASSOCIATION
901 Union Trust Bldg.
Washington, D.C. 20005

URBAN AMERICA
1717 Massachusetts Ave., NW.
Washington, D.C. 20036
City

LOCAL OFFICES OF NATIONAL PROFESSIONAL ORGANIZATIONS

AMERICAN INSTITUTE OF ARCHITECTS
Northern California Chapter
254 Sutter St.
San Francisco, CA 94108
362-7397
East Bay Chapter
1430 Franklin St.
Oakland, CA 94612
893-6834
California Council
1736 Stockton
San Francisco, CA 94108
986-0759

AMERICAN INSTITUTE PLANNERS
Northern California Chapter
559 Pacific Ave.
San Francisco, CA 94133
362-4703

AMERICAN SOCIETY OF LANDSCAPE ARCHITECTS
Northern California Chapter
706 Sansome St.
San Francisco, CA 94111
ASLA News

REFERENCE TOOLS

Periodicals
Lists, Directories, General Reference
Visual Aids

Periodicals, lists, directories, printing offices, and television can save time in obtaining references, keeping information current and exciting, and generating new perceptions in environmental education.

PERIODICALS

Regular bulletins, newsletters, magazines or journals are published by almost every citizen group and governmental agency.

Though mentioned elsewhere, some periodicals are of such general interest or quality, every school could use one or several subscriptions:

AUDUBON MAGAZINE
1130 Fifth Ave.
New York, NY 10028
(6/yr, $8.50)

CRY CALIFORNIA
691 Market St.
San Francisco, CA 94105
(4/yr, $9.00)

DEFENDERS OF THE WILDLIFE NEWS
2000 N St., NW.
Washington, D.C. 20036
(6/yr, $5.00)

NATIONAL WILDLIFE
1414-16th St., NW.
Washington, D.C. 20036
(6/yr, $5.00)

NATURAL HISTORY
American Museum of Natural History
Central Park West/79th St.
New York, NY 10024
(12/yr, $5.00)

SIERRA CLUB BULLETIN
1050 Mills Tower
San Francuco, CA 94104
(12/yr, $5.00)
S.F. Bay Chapter YODELER
(12/yr, $2.00)

Newsprint publications reflect the concerns and action view of many new groups:

EARTH
State Agriculture Bldg., Rm. 210
Embarcadero at Mission
San Francisco, CA 94105
(12/yr., $.75 ea.)

EARTH
2179 Allston Way
Berkeley, CA 94704
(26/yr, $3.50)

ECOLOGY JOURNAL
Ecology Action Educational Institute
Box 9334, Berkeley, CA 94709
Intermittent publication

ENVIRONMENTAL ACTION BULLETIN
Rodale Press, Inc.
Emmaus, PA 18049
(10/yr)

NORTHWEST GUARDIAN OF THE ENVIRONMENT
P.O. Box 2537
McKinleyville, CA 95521

NORTHWEST PASSAGE
1308 E St.
Bellingham, WA 98225
(24/yr, $5.00)

Magazines emphasizing issues, facts and aspects of the entire environmental scene:

CATALYST
333 East 46th St.
New York, NY 10017
(4/yr, $5.00)

ENVIRONMENT
438 N. Skinker Blvd.
St. Louis, MO 63130
(10/yr, $8.50)

ENVIRONMENT ACTION
Rm. 200, P St.
Washington, D.C. 20036
(Student $3)

ECOLOGY ACTION REPORTS
P. O. Box 3738
Stanford, CA 94305
(6/yr, $28.00)

Of particular interest to teachers and educators:

JOURNAL OF ENVIRONMENTAL EDUCATION
Denbar Educational Research Services, Inc.
Box 1605
Madison, WI 93701
(12/yr, $7.50)

SCIENCE AND CHILDREN
1201-16th St., NW.
Washington, D.C. 20036
($4.00)

SCIENCE NEWS (Science Services)
A.A.A.S.
1719 N St., NW.
Washington, D.C. 20036
(52/yr, $7.50)

THE SCIENCE TEACHER
1201-16th St., NW.
Washington, D.C. 20036
(12/yr, $8.00)

Science and our natural world presented on the children's level:

BAY LEAF
110 Castanya Way
Menlo Park, CA 94025
(10/yr, $3.00)

NATURE AND SCIENCE
Central Park West/79th St.
New York, NY 10024
(16/yr, $4.95)

RANGER RICK'S NATURE MAGAZINE
381 W. Center St.
Marion, OH 43302
(10/yr, $6.00)

LISTS, DIRECTORIES, GENERAL REFERENCE

Mass media provides continuous stimulation:

"Ecology - the Crisis of Survival"
Five to eight minutes of each Wednesday night news broadcast at 7 p.m. is devoted to one area of the environment - air, water, land, politics or population. KPIX, Channel 5.

"This Land"
A full page of conservation thought-provokers by Harold Gilliam, almost every Sunday in "This World" section of the San Francisco Chronicle.

Where to obtain the lists, catalogs and items you may need:

CALIFORNIA STATE PRINTING OFFICE
North 7th and Richards Blvd.
Sacramento, CA 95814

U.S. GOVERNMENT PRINTING OFFICE
Washington, D.C. 20402

GOVERNMENT BOOKSTORE
450 Golden Gate, Box 36104
San Francisco, CA 94102
556-6657

ECOLOGY TRADING CENTER
788 Old County Rd.
Belmont, CA 94002
592-0305

WHOLE EARTH TRUCK STORE–PORTOLA INSTITUTE
558 Santa Cruz
Menlo Park, CA 94025
323-0313

BOOK PEOPLE
2010-7th St.
Berkeley, CA 94703
841-1984

CALIFORNIA GREEN LACEWINGS, INC.
2521 Webb Ave.
Alameda, CA 94506

CALIFORNIA BUG COMPANY
Rt. 2, Box 335
Auburn, CA 95603
Lady bugs, praying mantis.

INSECT CONTROL CENTER
2 First St.
E. Norwalk, CT 06855
Praying mantis eggs.

L.E. SCHNOOR
646 Elm Street
Yuba City, CA 95991
Lady bugs.

M.D. HYDROPONICS
P.O. Box 16215
San Francisco, CA 94116
Plant nutrition.

MONARCH BUTTERFLY RESEARCH
Zoology Dept., University of Toronto
Ontario, Canada
Material and information on tagging monarch butterflies.

CALIFORNIA DEPARTMENT OF FISH AND GAME
Sacramento, CA 95814
"Striped Bass Fishing Map" - excellent map of North Bay and Delta.

Directories and Indexes:

Conservation Directory
National Wildlife Federation
1412-16th St., NW.
Washington, D.C. 20036
($1.50)

"Decision Makers in the S.F. Bay Area"
419 El Cerrito Ave.
Piedmont, CA 94611
($.25)

"Do You Know Your Bay Area?"
1398 Wright Ave.
Sunnyvale, CA 94087
($1.00)

"Environmental Action Directory"
Santa Clara Planning Department
70 West Hedding
San Jose, CA 95110

Free Conservation Material (Padway)
Napa County Superintendent of Schools
1130 Main St.
Napa, CA 94558

"Grass Roots"
Ecology Center
2179 Allston Way
Berkeley, CA 94704
($.50)

"Free and Inexpensive Conservation Publications" Index and Reference File compiled by California Conservation Council available for use at:
National Audubon Society
Bay Area Education Services
1749-A Grove St.
Berkeley, CA 94709

Selected Free Materials for Classroom Teachers
by Ruth H. Aubrey, 1969.
Fearon Publishers,
Palo Alto, CA 94301

Legislators, laws and prospects:

"California State Legislators"
Friends Committee on Legislation of California
2160 Lake St.
San Francisco, CA 94121
($.15)

Laws Relating to Conservation Planning and Zoning
California Documents Section
P.O. Box 20191
Sacramento, CA 95820
($12.50)

"Environmental Bill of Rights"
California Assembly Select Committee on Environmental Quality, March 1970.
Ask your assemblyman.

Roster of Commissions
California Chamber of Commerce
455 Capital Mall
Sacramento, CA 95814
($2.10)

Libraries are good sources of information:

CONSERVATION LIBRARY CENTER OF NORTH AMERICA
Public Library of the City and County of Denver
1357 Broadway
Denver, CO 80210

PUBLIC LIBRARIES
Use local public library. Many have reference desk services.
Refer to almanacs, encyclopedias, Readers Guide, Indexes and Directories.

UNIVERSITY AND COLLEGE LIBRARIES
University of California, Berkeley
642-2374
California State College, Hayward
538-8000

VISUAL AIDS

Environmental-Conservation films, filmstrips and slides are in considerable demand, and the titles are generally booked well in advance. Check the annotated indexes, write or phone for some catalogues, and take your choice of a very broad spectrum.

GOVERNMENT FILMS

Government films are generally free of postage only, so scheduling is frequently tight.

Federal Agencies

Department of Agriculture:

SOIL CONSERVATION SERVICE
Motion Picture Library
701 NW. Glisan St.
Portland, OR 97209
"Mud"

U.S. FOREST SERVICE
Film Library
1840 Alcatraz Ave.
Berkeley, CA 94703
654-3006
"Patterns of the Wild"

Department of the Interior:

BUREAU OF COMMERCIAL FISHERIES
Audio-Visual Service
1815 N. Fort Myer Dr.
Arlington, VA 22209
"Estuarine Heritage"

BUREAU OF LAND MANAGEMENT
Department of the Interior
Washington, D.C. 20240
"Last Frontier"

BUREAU OF MINES
Graphic Services Section
4800 Forbes St.
Pittsburgh, PA 15213
"California and It's Natural Resources"

BUREAU OF RECLAMATION
Film Management Center
Bldg. 67, Denver Federal Center
Denver, CO 80225
"Water for the Valley"

BUREAU OF SPORT FISHERIES AND WILDLIFE
730 NE. Pacific St.
P. O. Box 3737
Portland, OR 97208

NATIONAL PARK SERVICE
Chief, Audio-Visual Arts Division
Harpers Ferry, WV 25425
"This Land"

California State Agencies

DEPARTMENT OF FISH AND GAME
Rm. 3000, Ferry Bldg.
San Francisco, CA 94111
557-2237

DEPARTMENT OF PARKS AND RECREATION
P.O. Box 1296
Santa Rosa, CA 95403
Attention: Mr. James Neider
542-7190

DEPARTMENT OF PUBLIC HEALTH
Film Library
2151 Berkeley Way
Berkeley, CA 94704
943-7900
Rental fee: $5

RESOURCES AGENCY
1416 Ninth St.
Sacramento, CA 95814
455-2358

[redacted]

NORTHERN CALIFORNIA COMMITTEE FOR ENVIRONMENTAL INFORMATION
Educational Chairman
P.O. Box 761
Berkeley, CA 94701

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LISTS AND INDEXES

The following are annotated for subject matter, and sometimes include recommended grade level and curriculum area.

"A Critical Index of Films and Filmstrips in Conservation" (Conservation Foundation)
O'Hare Books
10 Bartley Rd.
Flanders, N. J. 07846
$1.00

"An Analysis of Audio-Visual Materials Relative to Conservation Education"
(Report for State Department of Education)
Conservation Department
Bureau of Elementary Secondary Education
721 Capitol Mall
Sacramento, CA 95814

Film Evaluations and Study Discussion Guides
St. Clemens Film Association
423 W. 26 St.
New York City, NY 10036

"Listings of Conservation Films - and related Natural Resource film subjects"
United States Department of the Interior
Office of the Secretary
Washington, D.C. 20240

"Selected List of Filmstrips on the Conservation of Natural Resources" (C.E.A.)
Interstate Printers and Publishers, Inc.
Danville, IL 61823
($.75)

BUSINESSES, CORPORATIONS AND INDUSTRIES

Many businesses sponsor films available through local distributors. The following are glad to accomodate requests for lists of what is available and can often make helpful suggestions.

AMERICAN FOREST PRODUCTS INDUSTRIES
1816 N St., NW.
Washington, D.C. 20006

ATLANTIC-RICHFIELD COMPANY FILM LIBRARY
55 Hawthorne St.
San Francisco, CA 94105

MODERN TALKING PICTURE SERVICE
16 Spear St.
San Francisco, CA 94105
982-1712
Distributors for:
DOW CHEMICAL CO., "Air, Water and Industry"
EASTMAN KODAK CO., "All the Difference"
CATERPILLAR TRACTOR CO., "The Trouble with Trash"
MORTON SALT CO., "Water"
HUMBLE OIL CO., "Wild Rivers"
WATER REFINING CO., "Living with Today's Water"

GENERAL MOTORS CORP., "The Answer is Clear"
AMERICAN PETROLEUM INSTITUTE, "To Clear the Air"

NATIONAL ASSOCIATION OF MANUFACTURERS
277 Park Ave.
New York, NY 10017

PACIFIC TELEPHONE FILM LIBRARY
16 Spear St.
San Francisco, CA 94105
"To Keep America Beautiful"

PACIFIC GAS AND ELECTRIC COMPANY FILM LIBRARY
16 Spear St.
San Francisco, CA 94105

SHELL OIL COMPANY FILM LIBRARY
450 N. Meridian
Indianapolis, IN 46204

STANDARD OIL COMPANY FILM LIBRARY
16 Spear St.
San Francisco, CA 94105

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Forest and Wood Associations
Timber and Paper Companies
Wild Life
Petroleum, Oil and Gas
Ores and Minerals
Agriculture and Chemicals
General

Many business associations and corporations, by their operations and research, provide a variety of conservation classroom aids. Materials may include leaflets, kits, charts, maps, films or even speakers on particular programs. Some sponsor environmental projects. Contact the research, education or public relations divisions. All are eager to project their message. Materials suggested are samples of those available.

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NORTHERN CALIFORNIA INDUSTRY-EDUCATION COUNCIL
235 Montgomery St.
San Francisco, CA 94104
731-3282
Businesses cooperate with schools in various programs.
Newsletter

[redacted]

AMERICAN FOREST INDUSTRIES
681 Market St., Room 874
San Francisco, CA 94105
982-5047
Chart: "Growth of a Tree"
Booklet: "Forest Adventures of Mark Edwards"

AMERICAN FOREST INSTITUTE
1835 K St., NW
Washington, D.C. 20006
Charts:
"Forest Trees of the U.S."
"Products of a Tree Farm"

CALIFORNIA FOREST PROTECTIVE ASSOCIATION
1127-11th St.
Sacramento, CA 95814

CALIFORNIA REDWOOD ASSOCIATION
617 Montgomery St.
San Francisco, CA 94111
392-7880
Booklet: "Story of the Redwood Forest"

NORTHWEST PULP AND PAPER ASSOCIATION
2633 Eastlake Ave.
Seattle, WA 98102

REDWOOD EMPIRE ASSOCIATION
476 Post St.
San Francisco, CA 94106

REDWOOD REGIONAL CONSERVATION COUNCIL
224 Rosenberg Bldg.
Santa Rosa, CA 95404
Booklet: "Words of the Woods"

WEST COAST LUMBERMEN'S ASSOCIATION
1410 SW Morrison St.
Portland, OR 97214

WESTERN WOOD PRODUCTS ASSOCIATION
700 Yeon Bldg.
Portland, OR 97204

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waterways.

AMERICAN FOREST PRODUCTS CORPORATION
2740 Hyde St.
San Francisco, CA 94109
Magazine: *The American Eagle*

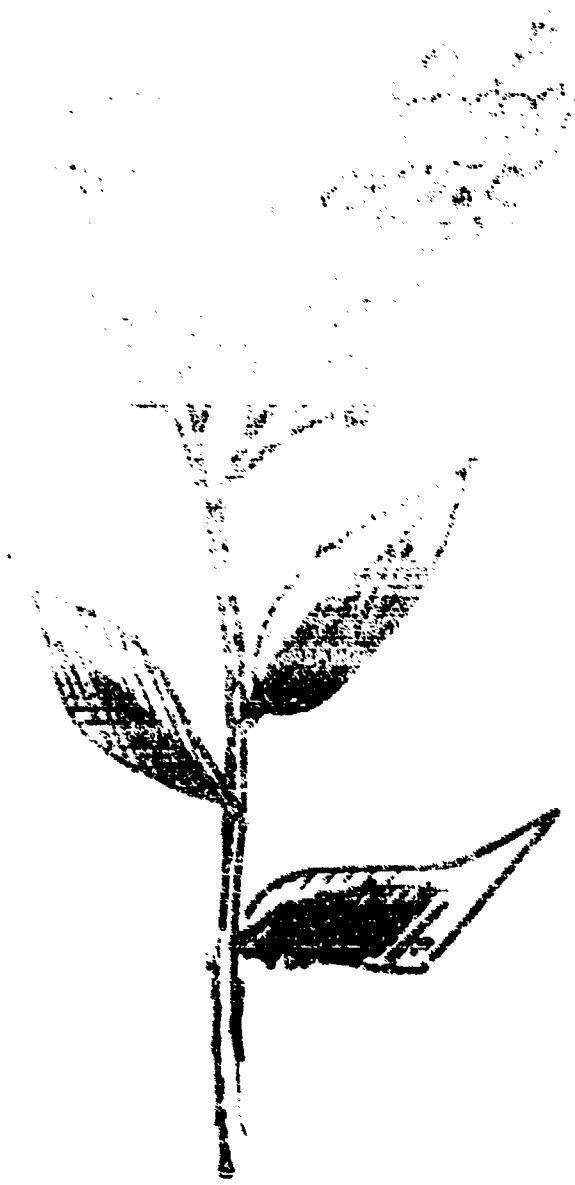
CROWN ZELLERBACH CORPORATION
Public Relations Department
1 Bush St.
San Francisco, CA 94119

GEORGIA-PACIFIC CORPORATION
249 East Grand Ave.
S. San Francisco, CA 94082

INTERNATIONAL PAPER COMPANY
Public Relations Office
1777 Murchison Dr.
Burlingame, CA 94011
697-9600

KIMBERLY-CLARK CORPORATION
Shasta Division
Anderson, CA 96007
"Watch on the Waters, "New Rivers"

MASONITE CORPORATION
701 Welch Rd.
Palo Alto, CA 94304



PACIFIC LUMBER COMPANY
Weott, CA 95571

RELLIM REDWOOD COMPANY
P.O. Box 356
Crescent City, CA 95531
Booklet: "Demonstration Forest"

ROCKPORT REDWOOD COMPANY
224 Rosenberg Bldg.
Santa Rosa, CA 95404

WEYERHAUSER TIMBER COMPANY
Educational Department
Tacoma, WA 98401
Booklet: "Tree Farms"

WILDLIFE

OYSTER INSTITUTE OF NORTH AMERICA
22 Main St., Sayville
Long Island, N Y 11182
Promotes and advances shellfish industry.

U.S. TROUT FARMERS ASSOCIATION
67 West 9000 S.
Sandy, UT 84020
American Fishes

OLIN CONSERVATION DEPARTMENT
Winchester-Western Division
East Alton, IL 62024
Reminton Farms
Chestertown, MD 21620
Game management for sports

JAPAN SILK ASSOCIATION
385 Fifth Ave.
New York City, NY 10016
Silk worm kit, booklet.

PETROLEUM, OIL AND GAS

Available publications and aids may include information on natural beauty, wildflowers, geology and general conservation values.

AMERICAN PETROLEUM INSTITUTE
1271 Avenue of the Americas
New York, NY 10020
Conservation Portfolio

WESTERN OIL AND GAS ASSOCIATION
Community Relations Department
3401 Clement St.
San Francisco, CA 94121
752-2514
Chart: Science in the Search for Oil

HUMBLE OIL AND REFINING COMPANY
Public Relations Department
Film Library
16 Spear St.
San Francisco, CA 94105
982-1712
Pamphlet:
"Humble Comes to Benecia"
"Wild Rivers"

PHILLIPS PETROLEUM COMPANY
Public Relations Department
375 Illinois St.
San Francisco, CA 94107
986-0188

RICHFIELD DIVISION OF ATLANTIC RICHFIELD COMPANY
417 Montgomery St.
San Francisco, CA 94104
392-3010
Booklet: "Western Wildflowers"

SHELL OIL COMPANY
Public Relations Department
100 Bush St.
San Francisco, CA 94104
392-5400

STANDARD OIL COMPANY OF CALIFORNIA
Public Relations Department
225 Bush St.
San Francisco, CA 94120
434-7700
Booklets:
"Conserving Our Wildlife"
"Let's Collect Rock"
"Let's Collect Shells"
"Arbor Day in the West"
"Anti-Litter Story"

ORES AND MINERALS

Valuable data on properties, uses of non-renewable resources

ASPHALT INSTITUTE
Asphalt Institute Bldg.
College Park, MD 20740
Pamphlet: "Magic Carpet"

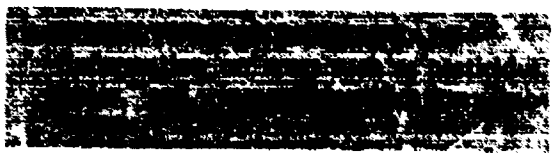
BARRE GRANITE ASSOCIATION
51 Church St.
Barre, VT 05641
"Story of Granite"

KAISER STEEL
Kaiser Center
300 Lakeside Dr.
Oakland, CA 94612
271-2211

KAISER GYPSUM COMPANY
Kaiser Center
300 Lakeside Dr.
Oakland, CA 94612
271-2211

MORTON SALT
110 N. Wacker Dr.
Chicago, IL 60606

PORTLAND CEMENT ASSOCIATION
33 West Grand Ave.
Chicago, IL 60610
Water control, dams, concrete, etc.



CHEVRON CHEMICAL COMPANY
Ortho Division
200 Bush St.
San Francisco, CA 94120

HERCULES, INC.
1 Maritime Plaza
San Francisco, CA 94111
986-2535
Agricultural chemicals.

INTERNATIONAL HARVESTER
2855 Cypress
Oakland, CA 94608
452-2828

SWIFT AND COMPANY
Agricultural Research Division
Chicago, IL 60604
Science series booklets.

GENERAL

EDISON ELECTRIC INSTITUTE
750 3rd Ave.
New York, NY 10017

KERN COUNTY LAND COMPANY
600 California St.
San Francisco, CA 94108
397-4100
Canal use operations, 1965.

NATIONAL ASSOCIATION OF MANUFACTURES
332 Emerson
Palo Alto, CA 94301
323-3143
Booklet: "Our Native Land"

PACIFIC GAS AND ELECTRIC COMPANY
245 Market St.
San Francisco, CA 94111
781-4311
Booklets:
"Rivers of California
"Street Trees"
"Gateways to California"

XEROX CORPORATION
1260 Midtown Tower
Rochester, NY 14603
National Youth Conference on Natural Beauty and Conservation, 1966

RESOURCE AGENCIES, ORGANIZATIONS AND PROGRAMS

Selected Reference or Sources

DeBell, Garrett, Editor. *The Environmental Handbook.* Ballantine Books, Inc., New York, 1970.

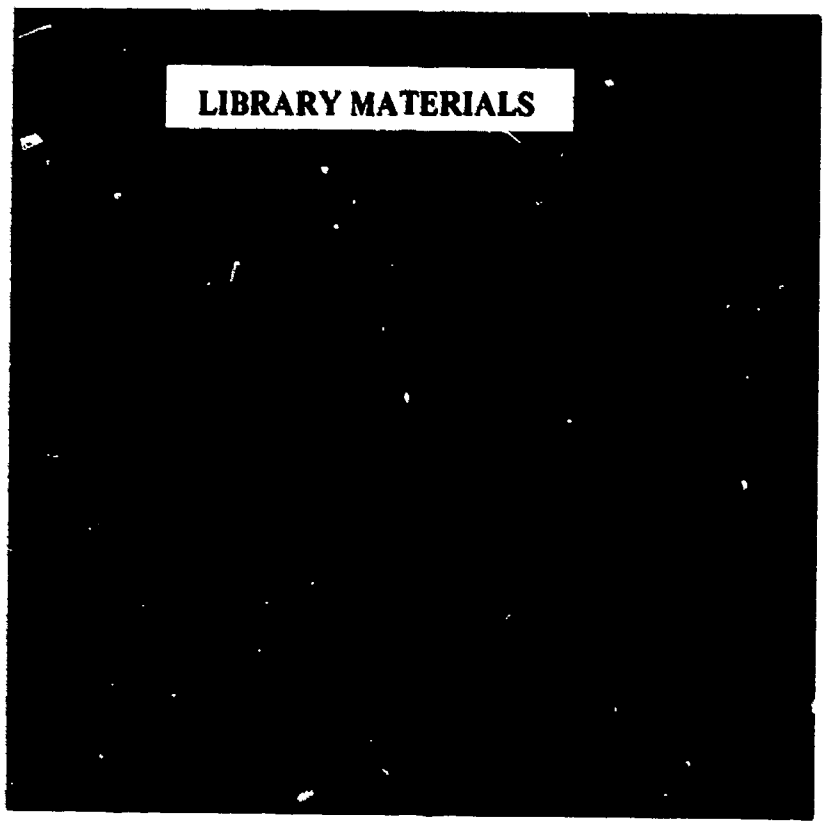
Dreisbach, Robert H. *Handbook of the San Francisco Region.* Environment Studies, Box 5185, Stanford, California, 1969.

Ecology Action, 9334 Benvenue, Berkeley, California 94705.

Mitchell, J.G. and C.L. Stallings, Editors. *Ecotactics.* Simon and Schuster, Inc., New York, 1970.

National Audubon Society, Bay Area Educational Services, 1749-A Grove Street, Berkeley, California 94709

Whole Earth Catalog. Portola Institute, 558 Santa Cruz Avenue, Menlo Park, California 94025.
Publishes six issues each year, two large ones and four smaller ones.



[redacted]

A selected bibliography of books about ecology, nature, plants and animals in the Alameda County Library children's collection.

[redacted]

The relationship between various living things and between living things and their environment.

General Ecology:

Friendly, Natalie. *Miraculous Web.* Prentice-Hall, Inc., New York, 1968.

Hirsch, S.C. *The Living Community: A Venture into Ecology.* Viking Press, New York, 1966.

Life (editorial staff). *The World We Live In.* Golden Press, Inc., New York, 1966.

Ecology of Specific Environments:

Allen, Durward L. *The Life of the Prairies and Plains.* McGraw-Hill Book Company, New York, 1966.

Amos, William H. *The Life of the Pond.* McGraw-Hill Book Company, New York, 1967.

Arnov, Boris. *Secrets of Inland Waters.* Little, Brown and Company, Boston, 1965.

Berrill, Norman J. *The Life of the Ocean.* McGraw-Hill Book Company, New York, 1966.

Brooks, Maurice G. *The Life of the Mountains.* McGraw-Hill Book Company, New York, 1968.

Church, Jeffrey. *The Desert Water Hole.* Follet Publishing Company, Chicago, 1962.

Clemons, Elizabeth. *Tide Pools and Beaches.* Alfred A. Knopf, Inc., New York, 1964.

Eckert, Allan W. *Bayou Backwater.* Doubleday and Company, Inc., Garden City, New York, 1968.

Hofmann, Melita. *A Trip to the Pond.* Doubleday and Company, Inc., Garden City, New York, 1966.

Kane, Henry B. *The Tale of a Meadow.* Alfred A. Knopf, Inc., New York, 1959.

——— *The Tale of a Pond.* Alfred A. Knopf, Inc., New York, 1960.

——— *The Tale of a Wood.* Alfred A. Knopf, Inc., New York, 1962.

Larson, Peggy. *Life in the Desert.* Childrens Press, Inc., Chicago, 1960.

Leopold, Aldo S. *The Desert.* Time, Inc., New York, 1962.

Lubell, Winfred. *In a Running Brook.* Rand McNally and Company, New York, 1968.

McCarthy, Agnes. *Creatures of the Deep.* Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 1963.

May, Julian. *The Big Island.* Follet Publishing Company, Chicago, 1968.

Morrow, Betty. *See Up the Mountain.* Harper and Row Publishers, Inc., New York, 1958.

Selsam, Millicent E. *Birth of a Forest.* Harper and Row Publishers, Inc., New York, 1964.

Stratton, Lucile N. *Wild Wings Over the Marshes.* Golden Gate Junior Books, San Carlos, California, 1964.

Wakeman, Norman H. *Wonders of the World Between the Tides.* Dodd, Mead and Company, New York, 1961.

[redacted]

Books to help children learn from direct observation of nature.

Allen, Gertrude E. *Everyday Trees.* Houghton Mifflin Company, Boston, 1968.

Berman, William. *How to Dissect: Exploring with Probe and Scalpel.* Sentinel Books Publishers, New York 1961.

Brown, Vinson. *How to Explore the Secret Worlds of Nature.* Little, Brown and Company, Boston, 1962.

———. *How to Make a Home Nature Museum.* Little, Brown and Company, Boston, 1962.

Conklin, Gladys P. *The Bug Club Book: A Handbook for Young Bug Collectors.* Holiday House, Inc., New York, 1966.

Disraeli, Robert. *New Worlds Through the Microscope.* Viking Press, Inc., New York, 1960.

Dowden, Anne O. *Look at a Flower.* Thomas Y. Crowell Company, New York, 1963.

Hawkinson, John. *Our Wonderful Wayside.* Albert Whitman and Company, Chicago, 1966.

Headstrom, Birger R. *Adventures with a Hand Lens.* J.B. Lippincott Company, Philadelphia, 1962.

Hoover, Helen. *Animals at My Doorstep.* Parent's Magazine Press, New York, 1966.

Hutchins, Ross E. *The Amazing Seeds.* Dodd, Mead and Company, New York, 1965.

———. *This is a Leaf.* Dodd, Mead and Company, New York, 1962.

———. *This Is a Tree.* Dodd, Mead and Company, New York, 1964.

———. *Wild Ways: A Book of Animal Habits.* Rand McNally and Company, Chicago, 1961.

Kieran, John. *An Introduction to Trees.* Doubleday and Company, Inc., Garden City, New York, 1966.

Lemmon, Robert S. *All About Birds.* Random House, New York, 1955.

Mason, George F. *Animal Tracks.* William Morrow and Company, Inc., New York, 1943.

Morgan, Alfred P. *Aquarium Book for Boys and Girls.* Charles Scribner's Sons, New York, 1959.

Morris, Percy A. *A Field Guide to Shells of the Pacific Coast and Hawaii.* Houghton Mifflin Company, Boston, 1966. (revised edition)

Pinney, Roy. *Collecting and Photographing Your Microzoa.* World Publishing Company, New York, 1965.

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APPENDIX A

Subject Required Instruction	State Requirement	Code References
protection and conservation of resources	**grades 1-12** the protection and conservation of resources, including the necessity for the protection of our environment	EC 8503
social science	**grades 1-12** provide a foundation for understanding the history, resources, development and government of California and the United States of America; man's relations to his human and natural environment; and contemporary issues	EC 8551 (c) and EC 8571 (b)
science	**grades 1-6** including the biological and physical aspects, with emphasis on the processes of experimental inquiry and on man's place in ecological systems	EC 8551 (d)
	grades 7-12 including the physical and biological aspects, with emphasis on basic concepts, theories and processes of scientific investigation and on man's place in ecological systems, and with appropriate applications of the interrelation and interdependence of the sciences	EC 8571 (e)
Conservation, Bird, and Arbor Day	observe March 7, the anniversary of the birthday of Luther Burbank, by including suitable exercises	EC 5205
Related to Instruction		
outdoor science and conservation programs	governing board of any school district may conduct programs and classes in outdoor science and conservation education within or without the boundaries of the school district (authority for personnel, supplies, property, contracts, transportation)	EC 6011 (a,b,c,d)
planning and implementation grants in conservation education	the State Superintendent of Public Instruction, upon the recommendation of the Conservation Education Service, is authorized to make planning and implementation grants to individual school districts, or groups of school districts, unified school districts, county superintendents of schools, the University of California, the state colleges and the community colleges to assist such entities in the development of programs and curriculum in conservation education (may involve state and local agencies. May include inservice training, preservice training, material development, regional conservation education centers)	EC 6011.5-6011.9 also see EC 568.9-569.4
forestry programs	governing board of any school district may conduct courses in forestry (authority for personnel, supplies, property, contracts, transportation)	EC 6012 (a,b,c,d)
county outdoor education programs	the county superintendent may provide programs and classes in outdoor science and conservation education, and coordination services (authority for funding, property, personnel, supplies, contracts, leases)	EC 6013-6023
State Advisory Committee on Conservation Education	establishes 13-member Advisory Committee on Conservation Education to assist and advise the State Board of Education on programs related to wise use of natural resources, interrelated nature of living processes, and the impact upon the environment and ecological systems of pollution and major land alterations	EC 566-566.4

Subject	State Requirement	Code References
conservation education service	there is in the Department of Education the Conservation Education Service (defines powers and duties)	EC 567-567.3
conservation education library	there is in the Department of Education a central library and repository for conservation education materials (outlines purposes and duties)	EC 568-568.3
environmental internship programs	outlines environmental internship program; agencies involved, duties, application, academic credit, employment	EC 570-570.4
textbooks	the State Board of Education shall, when adopting textbooks and teachers' manuals for use in elementary schools for the teaching of courses in science, include only such textbooks which emphasize man's place in ecological systems and the necessity for the protection of the environment	EC 9305.5
	the conservation education library shall advise the board in adoption of textbooks in regard to meeting the requirements for conservation education	EC 568.3

APPENDIX B

FEDERAL AND STATE LAWS AND REGULATIONS

FEDERAL

National Environmental Policy Act of 1969

Public Law 91-190

Section 102 (C)

Include in every recommendation or report on proposals for legislation and other major federal actions significantly affecting the quality of the human environment, a detailed statement by the responsible official on

(i) the environmental impact of the proposed action

(ii) any adverse environmental effects which cannot be avoided should the proposal be implemented

(iii) alternatives to the proposed action

(iv) the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and

(v) any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented

Prior to making any detailed statement, the responsible federal official shall consult with and obtain the comments of any federal agency which has jurisdiction by law or special expertise with respect to any environmental impact involved. Copies of such statement and the comments and views of the appropriate federal, state and local agencies, which are authorized to develop and enforce environmental standards, shall be made available to the President, the Council on Environmental Quality and to the public . . .

[redacted]

It is unlawful to cut, mutilate, remove or destroy any native tree, shrub, fern, herb, bulb, cactus, wildflower, huckleberry or redwood greens growing upon a state or county right-of-way.

It is unlawful to collect or transport for sale, any plants from public land, or from private land without written consent of the owner, notarized or acknowledged.

It is forbidden to gather flowers in our national or state parks and monuments.

It is illegal to cut or gather at *any time or place* the following: yuccas, snow plant, desert holly, smoke bush, cacti, and toyon. Native lilies should not be gathered.