

CHAPTER B - PUBLIC EDUCATIONAL ASPECTS OF SOLID WASTE MANAGEMENT

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Education and exposure of the public to the existing solid waste problems in the San Francisco Bay Area is necessary if public support is to be mobilized to solve them. As a result of education carried out through various institutions and organizations the public can become aware of the solid waste problems in the Bay Area. This chapter will discuss what government and community organizations are doing as far as solid waste education is concerned.

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The Association of Bay Area Governments (ABAG) has prepared a draft environmental management plan for the San Francisco Bay Area which includes policies on solid waste management. The proposed policy number 6 states "Federal, state, and local public educational programs are essential to promote awareness of the feasibility and need for waste reduction," (Peter Tiu, 1978, personal communication).

The California State Solid Waste Management Board has designed and funded educational programs. It is presently contracting with Sonoma County Environmental Center and San Diego Ecology Center, Inc. to develop instructional aid programs related to materials conservation and recycling for use in primary schools. The programs include: 1) a film on materials conservation and recycling; 2) a tape narrative for the film; and 3) a teacher's guide and activity booklet. The instructional aid program's goal is to increase student and teacher awareness of the solid waste problem and its effects on land, water and air. Its evaluation and completion date is July 1, 1978. The State Solid Waste Management Board hopes it will set a standard for future educational programs for the state.

Community, environmental and educational organizations in California have also initiated programs that deal mainly with environmental issues. Solid waste management is incorporated into the major teachings of these environmental educational organizations. The organizations promote solid waste education and produce action in solid waste recycling programs by getting the public involved and active in solid waste programs. The following list describes some of the different organizations that currently participate in environmental and solid waste education:

OBIS (Outdoor Biology Instructional Strategies)
Lawrence Hall of Science
University of California
Berkeley, CA 94720

OBIS has developed independent and sequential activities to promote the understanding of ecology relationships. OBIS is a good educational and instructional organization which concentrates on outdoor biology and its techniques in environmental education are important and helpful in introducing basic concepts of ecology (Bay Area Environmental Education Resource Fair, 1977).

State Solid Waste Management Board (Sue Stack)
1709 11th Street
Sacramento, CA 95814

SSWMB has information available for solid waste management and has contracted Sonoma County Environmental Center and San Diego Ecology Center for solid waste educational programs.

California Anti-Litter League
1978 98th Avenue
Oakland, CA 94603

The Anti-Litter League deals mainly with littering aspects of solid waste management. It provides information and distributes pamphlets on litter control and solid waste management.

Ecology Center
2701 College Avenue
Berkeley, CA 94705

The Ecology Center provides the public vital information on environmental problems and demonstrates practical alternatives. Projects include environmental library, curbside newspaper pick-up in Berkeley, research in alternative energy. It has published a useful educational teacher's guide, First Steps in Ecology (Bay Area Environmental Education Resource Fair, 1977).

Integral Urban House
1516 5th Street
Berkeley, CA 94710

The Integral Urban House is the urban center of the Farallones Institute, a California-based non-profit, tax exempt organization. The House is devoted to study and demonstration of environmentally sound strategies and techniques of home site food production, energy conservation and generation, waste recycling and pest management (Bay Area Environmental Education Resource Fair, 1977).

Environmental Protection Agency
215 Fremont Street
San Francisco, CA

EPA has available to students and teachers a variety of brochures and pamphlets in solid waste management. A special EPA program for grade school children enhances motivation to learn called the "President's Environmental Youth Awards." It serves as a vehicle to direct the creative talents of youth into constructive and productive work. It provides opportunities, incentives and rewards for the search for answers to environmental problems. EPA also has a variety of films, information packets, pamphlets, and a library which are available for viewing.

San Diego Ecology Center, Inc.

San Diego Ecology Center, Inc. is presently developing a pilot-program on solid waste management. The important points of the program are outlined below. The program guide is titled "Recycling - Solid Waste Management for Grades K-3: Teacher's Guide" (quotations in this section are taken from the guide). It is designed to help teachers present concepts of solid waste management to their kindergarten to third grade students. It contains a filmstrip and taped narration for short presentations, as well as activities for expanding solid waste concepts into a complete unit of study. Its objectives are to have the student:

"1) describe solid waste; 2) describe personal efforts to reduce solid waste; 3) describe the litter problem; 4) keep surroundings neat and clean; 5) make a creative project from recycled materials; 6) carry out a recycling project; 7) describe natural resources and the necessity for conservation; and 8) carry out a project to alert others to the solid waste problem."

The filmstrip and narration show and describe that solid waste is the trash we throw out, and that solid waste is brought to a landfill site and dumped. The filmstrip also describes how much trash is produced and shows different types of trash such as newspaper, glass bottles, plastic bags, metal cans, food garbage, and yard trimmings. Recycling and ideas for source separation are portrayed by showing piles of tied newspapers, glass in boxes, cartons of bottles and aluminum cans. Composting, gardening and litter prevention are also shown. The narration includes statements such as: "You can help your school look better by gardening and planting," and "You can be proud of your part by making your school look nicer." The filmstrip ends with the question, "Do you have any ideas how you can make less solid waste everyday?"

The guide provides ways in which the students can demonstrate what they have learned by writing essays and making displays. Examples of writing include: composing a short essay and illustrating it; pretending to be an object of solid waste and writing a story about what happens; writing a story, song or poem; writing a play or skit; making up riddles; making up a crossword puzzle or a word search; and writing a letter to the city's newspaper to tell what has been learned or to express an opinion on the solid waste problem. Moreover, examples of displays include: making a poster, mounting a collage of magazine pictures, designing a bulletin board; making a mural; making a shoebox; making a milk carton t.v. viewer for a film strip and collecting objects relating to solid waste.

The activities presented in this guide cover areas in natural resources, paper in classroom, litter, scrap art, composting, packaging, glass, aluminum cans, recycling, mathematics and what is termed action alert. Summaries of these activities are:

- a. The natural resource activities unit - teaches children how to identify natural resources, where natural resources come from and how to use natural resources. These activities also show which things are renewable and non-renewable. The activity introduces materials such as dirt, water, plants, metal spoons, paper, oil cans, plastic, glass, salt, air-filled balloons, chalk and nails. The children are introduced to the words "natural resources, renewable or non-renewable." They are instructed to match each material with each word. The children's project involves several activities which include: make a chart or display of natural resources, renewable and non-renewable materials, and to make what is called a "save it" conservation guide and post it in the room as a reminder.
- b. The paper in classroom activities unit - provides children with concepts of where paper comes from; how much paper is wasted, how much paper costs; and ways to conserve paper. Activities include: keeping track of how much paper each uses and how much the paper used costs for a day, week, and a month; they make recycled paper; and they make a chalkboard as an alternative to using paper.

- c. The litter activities unit - demonstrates that some litter is made up of natural resources, and that litter can be re-used or recycled. The activities include: children pick up litter around schools, they make hanging mobiles of litter; they make puppets out of paper bags; and decorate trash cans to publicize an anti-litter campaign.
- d. The scrap art activities unit - basically takes different forms of solid waste and makes them into art projects. For example, paper bags are decorated into litter bags and paper bag puppets; spools are made into dolls; magazines are made into solid waste mobiles, books, and paper bead necklaces; cans are made into pencil holders and book ends; bottles are made into vases, and paper maché; egg cartons are converted into flowers or caterpillars; and styrofoam meat trays are converted into letters of the alphabet or picture frames.
- e. The composting activities unit - involves observation of natural decay in the environment. Students are also taught the meaning of the term "biodegradable." The children observe different materials buried in the ground and observe changes in composition.
- f. The packaging activities unit - shows the children different available packages such as plastic bags, fast-food sacks, styrofoam trays, plastic, glass bottles and aluminum foil. The children discuss each kind of package and ways in which each one keeps things clean, unbroken and fresh. In one activity, they trace one ordinary item from production through packaging, use, discard, and disposal, in order to see the life cycle of solid waste.
- g. The glass activities unit - teaches what glass is made of, how it is made, where the ingredients for glass come from, that glass is recyclable and that glass should be saved. One activity describes returnable and non-returnable bottles. The children discuss the importance of recycling bottles.
- h. The aluminum can activities unit - provides discussion in what aluminum cans are made from, how they are made, where they come from, that they are recyclable and why they should be recycled. The difference between aluminum cans and bimetal cans is discussed, and aluminum can recycling is examined.
- i. The recycling activities unit - describes ways of recycling old usable items from one's home, aluminum cans, and newspapers. These activities provide the children ways of participating in a recycling project and show the importance of recycling.

- j. The mathematics activities unit - incorporates the solid waste concepts into basic mathematical problems. Math problems are shown through solid waste activities and projects; for example: solid waste objects come in shapes of cubes, cylinders, rectangular solids and spheres; solid waste can be measured by volume; solid waste data can be collected and graphed; and solid waste math games can be played.
- k. The action alert activities unit - shares knowledge of solid waste with various parts of society such as class, school, and home. Children are instructed to write to a newspaper and community organizations to acquaint other people with the problems of solid waste management. The children make up a list of hints for reduction of solid waste at home. Examples of this could be to: "1) use cloth napkins and towels, avoid paper; 2) buy products with little packaging; 3) re-use grocery bags; 4) decline bags at fast foods stands; 5) buy large containers of food when economically logical; 6) re-use gift wraps and junk mail; 7) buy returnable bottles; 8) re-use or recycle glass jars; 9) recycle newspapers and aluminum cans; 10) avoid buying plastics; 11) wash and re-use plastic bags and containers; 12) compost food garbage; 13) grow one's own vegetables (and thus avoid packaging altogether); 14) donate usable articles to thrift stores; and 15) think of solid waste while shopping.

The guide also provides a list of vocabulary words which are related to solid waste. The definitions used are very simple and clear. The words included are: biodegradable, compost, conservation, litter, natural resources, non-renewable resources, organic, organic gardening, recycle, renewable resources, sanitary landfill and solid waste.

Ideas for field trips are also presented in this guide. The possible field trips are: 1) walking around school and seeing if there is a litter problem; 2) walking around one's neighborhood and looking at litter, trash or a nicely planted yard or garden; 3) collecting classroom trash and delivering it to school trash container; 4) observing how trash is handled on pick-up day; 5) visiting a supermarket and investigating packaging, deposit and no-deposit bottles, and aluminum cans; 7) visiting a bottling plant; 8) visiting a metal salvage company; 9) visiting a paper manufacturer; 10) visiting a newspaper printer or print shop; 11) visiting a recycling center; 12) visiting a thrift shop; and 13) visiting a resource recovery center.

Sonoma County Environmental Center

In addition to the San Diego Ecology Center, Inc. program, the California State Solid Waste Management Board has funded Sonoma County Environmental Center to develop an educational program for elementary school grades four through six. This program is similar to the San Diego Ecology Unit, Inc. program;

however, it is somewhat more detailed and complex. It is developed for older students than is the San Diego program. The Sonoma County Environmental Program includes an instructional packet titled "Garbage Reincarnation - Interdisciplinary Approach to Materials Conservation and Recycling." Because the two are similar, only the highlights of the Sonoma County Environmental Program will be presented.

This program's objectives are divided into four sections: "1) solid waste: to have the student identify the contents of his trash can, place contents into different general categories related to their resource base; 2) everything goes somewhere: to have the student discover where things go, explore methods of waste disposal, amounts of energy and materials used in convenience packaging, and thinking about waste reduction and refuse; 3) recycling in classroom and the home - to have the student discover the resource base of materials, realize the amount of materials they waste, begin to recycle these materials and practice waste reduction and re-use; 4) community involvement - to have the student become involved in his or her own community, learn methods of communication, and begin to teach recycling to peers and parents."

The instructional packet includes activities in each of the above sections. The activities include: "1) garbage, 2) composting, 3) incineration, 4) sanitary landfills, 5) making a mini-landfill, 6) energy and food value, 7) exploring nine beverage container systems, 8) classroom materials inventory, 9) the vehicle of progress, 10) how much waste paper do you waste, 11) white paper recycling, 12) what you recycle, 13) recycling oil, 14) litter, 15) ecology club, 16) spread the word - RECYCLE, 17) letter writing, 18) news releases, and 19) service announcements."

The packet also includes a glossary with a valuable vocabulary list, a list of tried trip possibilities, a list of films, and a descriptive bibliography.

An example of an effective teaching technique employed in a related field for somewhat older students than either of the SSWMB programs is practiced by the Outdoor Biological Instructional Strategies (OBIS) at Lawrence Hall of Science, Berkeley, CA. OBIS has developed project-oriented activities to promote the understanding of ecological relationships for youngsters 10-15 years of age. OBIS's method of teaching revolves around activity-oriented school and community organizations (girl scouts, boy scouts, 4-H, etc.). OBIS tries to make children aware of the ecological relationships in the world around them and how to make sound environmental decisions. When students attain an understanding of the subject, they are instructed to communicate and share their findings. An example of an OBIS activity is called "natural recycling in soil." The basic objective of this activity is to teach which materials decompose in the soil. Students also learn that there is natural recycling of the earth's resources that returns essential raw materials to the earth. They compare the natural recycling processes of dead vegetation in different types of containers buried in the soil. From this activity, the children can acquire a basic understanding of natural recycling. They also become actively involved in the activity.

The OBIS method of teaching makes learning enjoyable while teaching children about an environmental issue. The importance of this approach is that it is one where students can learn about environmental problems more easily through activities rather than by classroom lectures.

Evaluation

The SSWMB programs should be effective and beneficial because they do meet the initial objectives of providing a basic understanding of solid waste management and its problems. By means of the film-strip and the natural resource activities dealing with various forms of solid waste, children are shown ways to identify solid waste, to separate the solid waste contents into general categories and they are given reasons to believe that solid waste can be decreased.

Activities involving glass, paper and aluminum cans teach the importance of recycling, source separation and reduction. The children discover the quantity of materials that are wasted. The activities and field trips help children observe and understand the quantity of solid waste produced and consumed. Also by being able to see how many different types of packaging techniques are used, children can become aware of the waste produced in packaging. This can lead to community and social participation on the part of students. The students can become interested in helping out in recycling programs, and communicate solid waste ideas to their friends and parents. Thus, the objectives of educating people about solid waste problems will be met.

The programs are also effective because they incorporate a curriculum of solid waste management with the general course studies of mathematics, science and English. Here children are exposed to environmental issues a little at a time rather than receiving a whole solid waste management course and its problems in a brief seminar or lecture. By making solid waste education a part of the basic teaching curriculum, children can become receptive to learning about solid waste problems. As pointed out in the OBIS program, children are motivated by enjoyable, activity-oriented learning experiences. The writing activities, math problems and art projects can help to develop children's participation in and awareness of the solid waste problems.

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